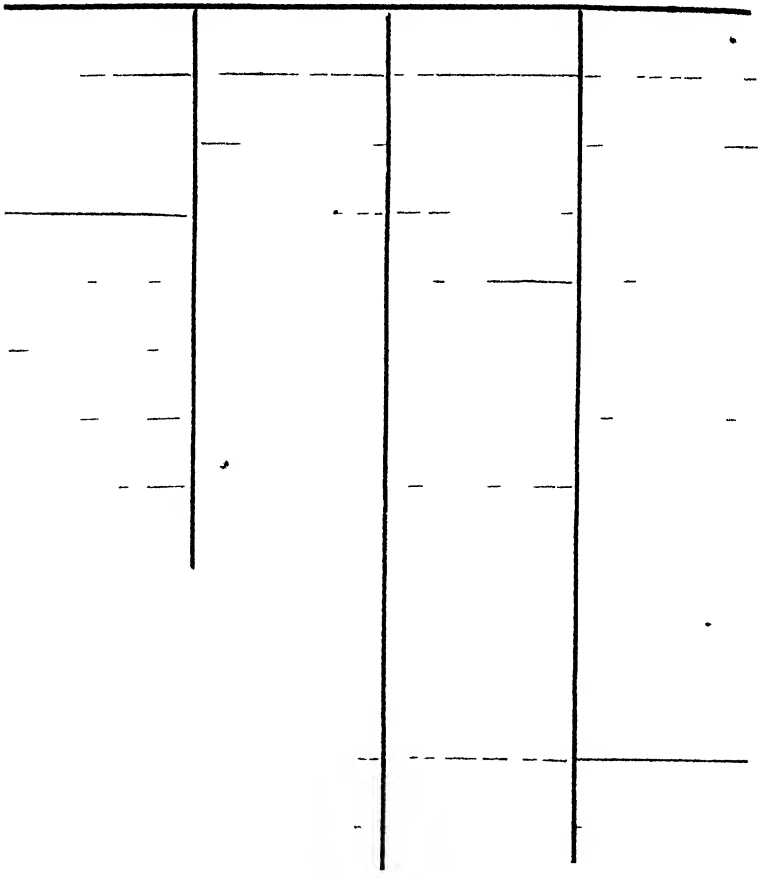

PUBLIC UTILITY REGULATION AND THE SO-CALLED SLIDING SCALE

A Study of the Sliding Scale as a Means of Encouraging and Rewarding Efficiency in the Management of Regulated Monopolies

BY

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PREFACE

UNDER conventional types of public utility regulation an efficient plant which charges relatively low prices is generally allowed to earn no more on its rate base than a less efficient company which charges relatively high prices. Rewards for efficiency, in other words, are not a basic part of ordinary regulatory procedure. Thus, management has little incentive, other than the desire to excel, to elevate its standards of performance; in consequence, prices paid by consumers are often higher than they need be.

The sliding scale (defined in Chapter I) is a method of regulation designed to overcome this deficiency. Although it has been used for eighty years in England, and at various times in the United States, the most important current experiment with the plan is to be found in Washington, D. C., where before its adoption electric prices were among the highest in the country; within eight years they were among the lowest. During this time, moreover, the company's net income has been substantially above 7% on the rate base.

Companies, commissions, and consumers throughout the United States have therefore taken a renewed interest in the sliding scale, and are seeking the kind of information and analysis which the following pages present.

Inasmuch as it was necessary to collect practically all of the material first hand, I have had to rely to a considerable degree upon assistance from the following individuals:

Mr. W. J. Smith, Secretary National Gas Council, London.
Mr. Leslie F. Stemp, London.
Sir Andrew R. Duncan, Central Electricity Board, London.

Sir John Brooke, Electricity Commission, London.
Dr. S. P. Langhoff Jr., Washington, D. C.
Prof. M. G. deChazeau, University of Virginia.
Mr. Edward J. Tucker, Secretary Consumers' Gas Co., Toronto.
Mr. Leland Olds, Secretary New York Power Authority.
Mr. James I. Metcalf, Consulting Engineer.
Mr. Basil Manly, Vice Chairman, Federal Power Commission.
Dr. W. E. Mosher, Director of Rate Survey, Fed. Power Comm.
Mr. Riley E. Elgen, Chairman
Mr. Richmond B. Keech, Vice Chairman
Mr. B. M. Bachman, Chief Accountant
Mr. James L. Martin, Secretary
Mr. E. J. Milligan, Chief Clerk
} Public Utilities Commission of the District of Columbia.
Mr. Johns Hopkins Sec'y., United Gas Improvement Co.
Mr. Conrad N. Lauer, Pres. Philadelphia Gas Works Co.
Mr. Alan Brooks, Sec'y., Dep't. of Public Utilities, Mass.
Mr. Henry C. Attwill, Ch'mn. Dep't. Pub. Utilities, Mass.
Mr. Alan Cunningham, Sec'y. Boston Consolidated Gas Co.
An Official of the North American Company.
Prof. Robert T. Livingston, Columbia University.
Prof. John M. Clark, Columbia University.
Prof. James C. Bonbright, Columbia University.

Professor Bonbright was the first to impress upon me the importance of this investigation, and the principal features which it should embrace. He took an active interest in the work as it progressed and contributed many suggestions for its improvement as it neared completion.

As I am profoundly indebted to these persons for their assistance, this public acknowledgment is only an earnest of gratitude. I, however, accept full responsibility for the material presented.

I. B.

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CHAPTER I

Introduction

Public Utility regulation in the last analysis is price regulation, limited by the fundamental requirement that a company's solvency must be maintained. An obvious paradox, however, follows: that is, an efficient plant which charges relatively low prices is allowed, in general, to earn no more on its rate base than a less efficient plant which charges high prices. Or, to reverse the statement, an inefficient plant which charges high prices is permitted to earn as large a return as an efficient plant which charges low prices. Thus no reward is offered for efficiency as such, which leaves little incentive for management to improve its operating standards. The result is higher prices in many instances than the public should be required to pay.

American students of public utilities have been so preoccupied with the problem of valuation since the inception of regulation that they have devoted little attention to this paradox. Whitten [1] and Morgan [2] have given more thought to it than other American writers; but Whitten's study is now twenty-three years old, and Morgan's was published twelve years ago. Accordingly, the present investigation was made into the practicability of utilizing the so-called sliding scale system of regulating public utilities, as a means of

[1] Whitten, R. H., *Regulation of Public Service Companies in Great Britain*, Appendix F, vol. i, Annual Report Public Service Commission of New York, First District, 1913.

[2] Morgan, C. S., *Regulation and the Management of Public Utilities* (Houghton Mifflin, 1923), *passim*.

rewarding efficiency of management, penalizing inefficiency, and reducing prices to consumers under a regime of private ownership and effective public control.

What is the sliding scale? Generally speaking the term refers to *any form of regulation in which the profit allowed increases or decreases in proportion as prices decrease or increase.* In the United States it has been the universal practice to distribute the excess or bonus to stockholders. In Great Britain, however, employees at a very early date were allowed to share in the reward, and that feature has now come to be an integral part of British sliding scale technique.

Inasmuch as our primary interest lies in an analysis of the type of sliding scale which was introduced as of January 1, 1925 by the Public Utilities Commission of the District of Columbia in its regulation of the Potomac Electric Power Company,[3] the chief characteristics of that scheme will be mentioned at this point.

Under the Washington Plan a basic or "normal" rate of return on the rate base is established; super-normal earnings of a given year are retained entirely by stockholders that year, but prices are reduced sufficiently to prevent a recrudescence of specified proportions of the excess the following year. By a series of successive price reductions the entire super-normal earnings of any one year tend to be absorbed in time. Conversely, if earnings on the rate base consistently fall below the "normal" rate of return the commission is under obligation to increase prices. We shall have more to say in later chapters about the origin of the surplus, the equity of paying it to stockholders, and the absence of a system of penalties.[4]

[3] Generally referred to in the industry, and in the following discussion, as the P. E. P. Co. or Pepco.

[4] Before adoption of the plan in 1924 Washington's electric rates were among the highest in the United States. Today they are among the lowest.

The sliding scale principle originated in Great Britain in the year 1855 when it was applied in the gas industry. At that time it was used primarily for the purpose of reducing prices rather than to increase efficiency, due no doubt to the absence of direct price regulation as we know it in this country. From that time to the present it has been an integral part of British regulatory policy: among statutory gas undertakings approximately 57% operate under the sliding scale, and the scheme is being extended as non-sliding scale companies come before Parliament in quest of additional corporate powers.

The same general type of control has found its way into the electrical industry of Great Britain, as will be indicated in Chapter III. Likewise under the British Railways Act (1921) provision is made in sections 58 and 59 for the sliding scale but as earnings since enactment of the law have been below the standard allowed, the arrangement has not come into active operation among British railroads.

From the British Isles this regulatory device migrated to Toronto, Canada, where it has been used since 1887 in the regulation of the Consumers' Gas Company (Chapter IV).

In 1905 the Board of Gas and Electric Light Commissioners of Massachusetts adopted a sliding scale patterned after the then current British type, for regulation of the Boston Consolidated Gas Company. The arrangement continued until the year 1926, when it was abandoned for reasons which are discussed in Chapter V. Additional sliding scale experiments in Philadelphia, Connersville (Indiana), Memphis, Dallas, and Houston are reviewed.

The chapters referred to thus far are only prefatory to a discussion of the Washington plan which is the modern American version of the sliding scale and the type which will in all probability be improved and extended if this

method of regulation is adopted more widely in the United States.[5]

Public service commissions throughout the country are in sympathy with the policy of rewarding management for superior performance and penalizing it for inefficiency. Since 1915 they have said in almost a hundred decisions investigated by the writer, that inefficiency should be penalized and efficiency recompensed, although it is evident from the cases that no methods have been devised for this purpose.[6] In order to be effective a system of rewards and penalties must be formalized (though not crystalized) to a degree that management can count upon it. This the sliding scale purports to do.

[5] The sliding scale forms a part of various service-at-cost franchises which have been utilized in the regulation of street railway companies; these experiments are not considered in the following discussion because they have been rendered virtually, if not entirely inoperative by the economic status of the street railway industry.

[6] See *Public Utility Reports Annotated*, cases cited under the headings: Dividends, Earnings, Economy, Efficiency, Incentive, Rates, Return, Sliding Scale.

CHAPTER II

The Sliding Scale Among Gas Companies of Great Britain [1]

I. THE EARLY PERIOD 1810-1868

Gas of illuminating power was obtained from the distillation of coal as early as the seventeenth century, but no practical use was made of it until the year 1798 when a Birmingham factory was lighted by gas.

[1] For the early history, down to the year 1918, I have relied mainly upon the *Report from the Select Committee on Gas Undertakings Together with Proceedings and Minutes of Evidence* ordered by the *House of Commons* to be printed 11th June, 1918. This is the most recent review of early British gas legislation.

Reference has been made also to Michael & Will *On the Law Relating to Gas and Water*, 6th ed., London, 1911, pp. 1-68, and *passim*.

Cf. also Chitty's *Statutes of Practical Utility*, vol. v, 6th ed. (London, 1911); Halsbury's *Statutes of England*, vol. viii (London, 1929), especially Preliminary Note, pp. 1181-1185.

Another useful source is Matthews, Nathan: *The Public Regulation of Gas Companies in Great Britain and Ireland, With Special Reference to the Sliding Scale* (Boston, 1905).

Occasional reference is made also to Whitten, Robert H., *Regulation of Public Service Companies in Great Britain* (New York, 1914). (This treatise is a reprint of Appendix F of the Annual Report of the Public Service Commission for the First District, State of New York, for the year ending December 31, 1913.)

For the period from 1918 to 1935 it has been necessary to rely upon unpublished sources for the most part. The Reports of the Gas Legislation Committee to the Board of Trade in the years 1932 and 1933 are of some value, although they do not give a satisfactory picture of the post-war era. The various Parliamentary Acts were used, but while a law indicates what has been done, it fails to disclose all of the circumstances which made its enactment necessary. Moreover, one must know

In 1805 it was used to light some private buildings in Manchester, and in 1807 experimental street lamps were erected in the city of London. The first company to be organized for the manufacture and sale of gas was the Gas Light and Coke Company, (London) incorporated in 1810. Between 1810 and 1854 twelve other companies were chartered for the purpose of supplying gas in various parts of London and vicinity; after 1842, all thirteen companies began encroaching on the territory of one another with the result that a highly competitive condition developed. Indeed the period from about 1810 to about 1860 was the most competitive era in the history of British gas companies. From 1860 to 1875 there was some statutory regulation and from 1875 to the present the sliding scale system of price and dividend control has been in use, although it was applied to the Sheffield Company as early as 1855. (Cf. Sec. 3). About 59% of the British gas industry subject to statutory control is operating under one form or other of the sliding scale at the time of writing (1935).

The early period (1810-1860) was speculative (as well as competitive), mainly because it was new.[2]

how the legislation has worked. In order to fill in these gaps it became necessary to correspond with Mr. W. J. Smith, Secretary of the National Gas Council (London) and with Mr. Leslie F. Stemp, member of the bar (London). Mr. Stemp submitted a carefully prepared memorandum covering the points on which the material at my command failed to throw sufficient light. He is well informed on the gas industry, and was recommended by the Gas Council.

[2] "There were people who regarded those undertaking the supply of gas as lunatics, and various towns were plastered with notices warning the public against the ridiculous suggestion of supplying gas or inflammable air." The current attitude of the public toward the use of gas in the early part of the nineteenth century on the American side of the Atlantic is indicated by the attitude of a New England newspaper editor who, in opposition to the use of gas for the purpose of lighting streets, "argued that artificial illumination constituted an interference with the divine plan of the world which had preordained that it should be dark

Early charters contained no limit as to price or rate of dividend; but beginning with the year 1841 it became customary to impose a limit of 10% upon the divisible profits of the company, with the right to make up from surplus profits of prosperous years, the arrears, if any, in the dividends of previous years.[3] No maximum price at which gas could be sold was fixed for any company until 1846.[4]

In 1850 Parliament imposed a maximum price of 4s. od. (96c)[5] in the charter of the Great Central Company, and in 1854 it fixed a maximum price of 6/0 ($1.44) in the charter of the Surrey Consumers' Company. In the years immediately following, similar maximum prices were fixed for other companies operating within the Metropolitan District (greater London).

Competition, however, was producing a situation in which dividends were much below the maximum rate allowed; arrears were piling up; and although the companies were allowed by law to make up those deficits, they were prevented from doing so by competitive conditions.

Finding that competition in the gas industry was beneficial to no one, the London companies operating on the south side of the Thames agreed in 1853 to apportion or district the territory among themselves; the companies on the north side of the river did likewise in 1857. This districting arrangement was given statutory sanction in the

at night; that emanations of illuminating gas would be injurious to health; and that the lighting of streets would induce people to stay out of doors late at night, thus causing them to catch cold, and would frighten horses, embolden thieves, and increase drunkenness and depravity." (See Jones, E., and Bigham, Truman C., *Principles of Public Utilities* (New York, Macmillan, 1931), p. 10.

[3] Accrington Gas and Water Act, 1841, cited by Matthews, *op. cit.*, p. 8.

[4] Bilston Gas Act, 1846, cited by Matthews, *op. cit.*, p. 8.

[5] In view of the fact that at the time of writing neither the U. S. nor the British Government has definitely stabilized the gold content of its currency, the old par of exchange is used.

Metropolis Gas Act of 1860,—which may be said to mark the official termination of competition in the British gas industry, and the beginning of the era of monopoly.

The Metropolis Gas Act of 1860 was the outgrowth of Parliamentary investigations and reports of the years 1859 and 1860. Although the use of a sliding scale for the regulation of dividends and prices was suggested by Dr. John Chalice (who represented a consumers' association) and the proposal was included in the official report of 1859, it was not incorporated in the Act of 1860. This legislation covered the following points: the monopolistic or districting arrangement established by the thirteen London gas companies between 1853 and 1857 was legalized; the right to make up dividend arrears, bestowed by the Act of 1847, was henceforth limited to a period of six years; companies were for the first time compelled to serve all those who applied within their district; consumers were given the right of appeal to the Home Secretary if the price of gas was increased beyond 4/6 ($1.08) unless by reason of an increase in the cost of producing gas; if a dispute over the cost of production arose, the question was to be arbitrated, but in no case might the price be higher than 5/6 ($1.32); finally, the illuminating standard was fixed at twelve candles.

This Act, however, did not give relief to consumers. It allowed the companies to charge 4/6 ($1.08) under ordinary circumstances, "which was the highest price charged at the time". In general, the effect of the legislation of 1860 was to enable the companies

to pay full dividends and to make up the arrears of six years authorized by the Act. Some companies reduced the price after this result had been achieved, but in other cases the price was raised; and generally speaking, the prices in the metropolis were higher than those in the provincial cities.[6]

[6] Matthews, *op. cit.*, pp. 10-11.

It soon became evident, moreover, that a uniform dividend of 10% (as a limit) was a very unequal privilege as far as individual companies were concerned because of the disparity between the capital turnover ratios of the various undertakings. For example, the amount of invested capital for every hundred pounds of annual income varied from £243 in the South Metropolitan, to £583 in the London. Thus, the former company "turned" its fixed capital once every 2.43 years, while the latter company required 5.83 years to accomplish the same result. Invested capital per ton of coal carbonized ranged from £4.35 in the Independent, to £10.89 in the Western. "To pay a dividend of 10% required all the way from 11d. (22c) in the Independent, to 2s. (48c) in the Western".

Popular dissatisfaction with the ineffectiveness of prevailing methods of regulation grew more articulate as the deficiencies of the Act of 1860 became evident. Feeling against the private companies ran so high that in 1866 the Corporation of the City of London sought to establish a competing supply of gas under a regime of public ownership and operation.

2. THE OFFICIAL REVISION PERIOD 1868-1875

The City of London Gas Act of 1868 introduced a new phase into the method of regulating the London companies.[7] The chief provisions of the Act were as follows:

(a) Certain of the metropolitan companies were permitted to consolidate.
(b) Dividends were limited to 10%.
(c) The candle power was fixed at sixteen.
(d) The maximum price was placed at 3/9 (90c) although in emergencies the price might be raised to 5/6 ($1.32).

[7] Subsequent legislation in 1868 and 1869 extended the provisions of this Act to other companies within the metropolitan district outside the city of London proper.

(e) Power was given to the Corporation of the City of London to purchase within three years the undertakings of the companies within the city limits.[8]

The extent to which this Act protected the public interest became clear a few years later. In the latter part of 1872 a coal shortage occurred in the British Isles, when the price of coal advanced more than 50%; whereupon the companies, one after another, came before the Board of Trade in quest of authority to increase prices. The result was that the revision commissioners in 1873 raised the price for the Chartered Company to 4s. 4d. ($1.04); for the Imperial Company in 1874 from 3s. 9d. (90c) to 4s. 8d. ($1.12); and for the Gas Light and Coke Company from 3/9 (90c) to 5s. ($1.20).

On the other hand, while the Imperial and the Gas Light and Coke Companies under sanction of the Act of 1868 raised their prices 22c and 30c respectively, the Independent, and the Surrey Consumers' Companies (which were not operating under the Act of 1868 at the time of the coal famine but rather under the Act of 1860) increased their prices respectively, only 8c and 6c. The South Metropolitan, which in 1872 had reduced its price to 3s. (73c), kept it there throughout the period of the coal shortage, and still managed to pay a ten-percent dividend. Moreover, in response to a circular inquiry sent in January, 1874, to about 1200 companies throughout the United Kingdom, only 334 out of a total of 800 who replied, reported that they had increased prices.

Two reasons for failure of the revision system stand out: first, the Act required the commissioners to allow companies a 10% dividend on their capitalization, but provided for the exercise of no regulatory control over the amount of that

[8] Michael and Will, *op. cit.*, p. 301 *et seq.*

capitalization. Second, the commissioners were bound to confine their inquiry as to earnings to the current year. This enabled a company to adjust its accounts during the year when a rate case was pending, so as to unfold almost any kind of picture it wished to present.

3. THE LEGISLATION OF 1875 AND 1876. INTRODUCTION OF THE TWO-WAY SLIDING SCALE

At the session of 1875 the Metropolitan Board of Works appeared before Parliament with three bills, all dealing with the gas industry of the Metropolis. The first proposed establishment of a city-owned supply. This bill was soon withdrawn because the authorities in the last analysis did not really want to set up a competing system. The second bill recommended purchase of the private companies by the city. This proposal likewise was withdrawn, at the request of the government, to allow time for further consideration of the matter. The third bill dealt with improved regulation of existing companies involving application of the sliding scale principle. Before we consider the details of this method of control as it took form in the Act of 1876, a word may be said of its evolution.

The sliding scale seems to have made its first appearance in the Sheffield Gas Act of 1855, according to the provisions of which the company was permitted to pay a dividend of 8% as long as the price of gas was over 3/6 (84c), but could declare a 10% dividend when the price was 3/6 or less.

In 1858 and 1859, it will be recalled, the London situation required Parliamentary investigations. In both instances, Dr. John Chalice, Officer of Health for Bermondsey, and representative of a society called the South London Gas Consumers' Mutual Protective Society, suggested adoption of a sliding scale of prices based on dividends, or on the cost of materials and labor. Again in 1860 the Parliamentary committee which framed the Metropolis Gas Act of 1860,

gave sympathetic consideration to the sliding scale, but the companies resisted the proposal and prevented its inclusion in the Act.

In 1866 and 1867, conditions in London necessitated further Parliamentary inquiries. While this investigation was under way the Sheffield Gas Company, which had been operating under the limited sliding scale for eleven years, applied to Parliament for power to issue more stock. In the Sheffield Act of 1866, which gave the company these additional powers, the following significant statement was inserted:

> Whereas experience has shown that the increase of the rate of dividend on the company's capital in proportion to the decrease in the general charge for gas, has worked beneficially for the public; it is expedient that (in order to induce the company to exert themselves to reduce still further the price of gas supplied by them) the rate of dividend out of profits which they may pay on their *further* capital, be increased in proportion to the reduction of their general charge for gas supplied by them.

The effectiveness with which the Sheffield plan worked is indicated by the fact that the price of gas fell from the maximum, 4/0 (96c) fixed in 1855, to 3/6 (84c) in 1866; while dividends on the sliding scale stock increased during the same period from 8% to 10%.

Therefore, on the new stock authorized in 1866 the government allowed the Sheffield Company 7% as long as the price of gas was over 3/3 (78c); 7½% if the price was between 3/3 and 3/0 (72c); 9% if the price was between 3/0 and 2/9 (64c); and 10% if the price was 2/9 or under. It is evident that the Act of 1866, (like that of 1855) provided a limited sliding scale in the sense that the 10% dividend could not be exceeded.

When Parliament convened in 1875, the Metropolitan Board of Works[9] promoted a bill which included a sliding

[9] Since 1888, the London County Council.

scale that worked only one way. That is, it made no provision for an increase in dividends above the statutory 10% in case the price of gas was reduced below 84c. The Board of Trade, however, believed that a sliding scale, to be both fair and effective, must work both ways,—that an increase in the price of gas should accompany a reduction in the dividend, and conversely, a decrease in the price should authorize increased dividends in some established proportion. The ratio suggested was that " for every penny (2c) or part of a penny charged in excess or in diminution of such standard price in any year, the . . . prescribed rate of dividend shall for such year be reduced or increased by five shillings in the hundred pounds per annum ", i. e., ¼ of 1 per cent.[10] However, the year 1875 ended without general legislation on the sliding scale, the companies evidently having been strong enough to defeat the plans of the Parliamentary committee.

The Commercial company of London, however, was at that time before Parliament with a bill that would vest it with power to carry through a consolidation with the Ratcliffe company. The former, moreover, was amenable to the sliding scale. Consequently the Commercial Gas Act, 1875, authorized the merger, but fixed the standard price of gas at 3/9 (90c) and the standard rate of dividend at 10%, and provided that " for every decrease or increase of one penny (2c) in the price of gas, the dividends of the company should be increased or decreased by 5/0 in the £100 per annum ", (¼ of 1%).

The ratio, ¼ of 1% for every penny variation in the price of gas above or below a standard or initial price, and a standard rate of dividend, usually ten per cent, constitutes what was for many years thereafter in England the " standard sliding scale ".

[10] See Metropolis Gas Act, 1876, 39 Victoria, p. 3.

In 1876 when the Gas Light and Coke Co., and the South Metropolitan Gas Co. were before Parliament in quest of additional corporate powers, they also accepted the sliding scale. Provisions of the two resulting Acts were the same as those in the Commercial Company's Act of the year before, except that for the South Metropolitan company the initial price was fixed at 3/6 (84c), while the new stock authorized was to be sold at auction instead of at par to existing shareholders inasmuch as old stock was selling at a premium.

The legislation of 1875 and 1876 fixed the ratio at ¼ of 1% in the rate of dividend for each penny (2c) variation in the price of gas. The Report of the Select Committee of 1899 recommended that the ratio be changed from ¼ of 1%, to ⅓ of 1% for each penny variation in price. This recommendation was embodied in the legislation of 1900, 1902, and 1903. No reason for selecting the original ratio of ¼ of 1% for every penny variation in price has been given, as far as the printed record goes. It so happens, however, that at the prices and dividends prevailing when the scheme was inaugurated, this ratio resulted in approximately proportional changes in dividends and prices. That is, the standard dividend was 10%; ¼ of 1% is one-fortieth of 10%. The standard price was approximately 3s. 9d.; and 1 penny (2c) is one-forty-fifth of 91c. However, in subsequent applications of the sliding scale, the same ratio has been maintained, whether the standard dividend has been 10%, 7%, or 5%.

4. THE WAR PERIOD AND SUSPENSION OF THE SLIDING SCALE

The first serious difficulty encountered by gas companies after the epoch-making legislation of 1875-76 came as a result of the war period 1914-18, when prices of coal and labor rose greatly and brought many companies to the verge of insolvency. Moreover, restrictions placed by the gov-

ernment on the use of lights at night when there was danger of air raids reduced the consumption of gas and added to the troubles of gas companies. Although sliding scale and maximum dividend companies were both affected, the latter could look forward to the post war period when they would maintain their relatively high prices and thus make up some of the losses sustained during the war period; but the sliding scale companies could not do this because in proportion as they kept their prices up, they would be compelled to keep their dividends down.

Accordingly a Select Committee on Gas Undertakings was appointed April 22, 1918, to consider and report whether

it is expedient that some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of Gas Undertakings whose circumstances have been injuriously affected by causes arising out of the war, and if so, on what terms and conditions and whether by private bill or general legislation.

The committee agreed unanimously that relief should be granted the companies; and on August 8, 1918, Parliament approved an Act authorizing a modification of statutory provisions to the effect that

. . . no modification shall be authorized which is more than sufficient to enable with due care and management a dividend on the ordinary stock or shares of the undertaking to be paid at three-quarters of the standard or maximum rate of dividend, if any, prescribed for the undertaking, or at three-quarters of the pre-war rate of dividend, whichever is lower.

The " pre-war " rate of dividend was defined as the " average rate of dividend for the three financial years immediately preceding the war." The Act was intended to have effect during continuance of the war and a period not to exceed two years after termination of the war.[11]

[11] 8 & 9 Geo. 5, Chapter 34 (1918).

5. THE BASIC SYSTEM

Under the standard and maximum price forms it is impracticable to introduce two-part tariffs and block rate forms of charge or to supply gas at a low flat rate subject to a periodical minimum payment, as such forms may reduce substantially the dividends payable by the company. For example we may assume that a company having a standard price of 1/- per therm agrees to supply gas at a standing (service) charge of 10/- per quarter and at a commodity charge of 4d., per therm. A consumer who takes only two therms of gas during the quarter will be charged 10/8d., or 5/4d., per therm, which is greatly in excess of the standard price and would have the effect of reducing permissible dividends to an absurdity. The difficulty might be overcome by basing the sliding scale on the *average* price of gas during a period; but the Board of Trade has refused to sanction a sliding scale based upon an average price on the ground that it would fail to protect small consumers, particularly where undertakers supply large quantities of gas at low rates for industrial purposes.

It was mainly for the purpose of meeting these difficulties that the basic system of control was introduced in the South Metropolitan Gas Act, 1920. In its simplest form it has been described as follows:

A company is given a basic price (say 1/- per therm) and a basic dividend (say 5%). If it sells X therms in a year its basic revenue would thus be X shillings. If, however, it succeeds in selling gas at prices less than the basic (say 8d., 9d., and 10d.) and thereby derives a revenue of Y shillings (i. e. something less than X shillings) it is permitted to pay a fraction (generally one-sixth) of the difference between X shillings and Y shillings by way of an addition to this basic dividend of 5%. It is usual for provision to be made for setting aside a similar sum for the benefit of the company's co-partner employees.

The latest form of the basic system is to be found in the Southampton Gas Order [12] which provides that at the end of each year or half year the following computations shall be made:

(i) A calculation of the sum (if any) by which the total amount payable to the company for gas supplied consumers during that year or half year at a price per therm equal to or exceeding seven-tenths of the ordinary price is less than the amount which would have been payable if the gas had been supplied at the basic price;

(ii) A similar calculation in relation to gas supplied consumers during the same period at a price less than seven-tenths but not less than three-fifths of the ordinary price;

(iii) A similar calculation in relation to gas supplied consumers during the same period at a price less than three-fifths but not less than one-half the ordinary price; and

(iv) A similar calculation in relation to gas supplied consumers during the same period at a price less than one-half the ordinary price.

If the balance in the net revenue account (after providing for dividends on preference shares and those at the basic rate on ordinary shares of the company) in the opinion of the directors permits, a sum not exceeding the aggregate of the following sums

(a) 1/3 of the sum calculated pursuant to paragraph (i) above;
(b) ¼ of the sum calculated pursuant to paragraph (ii) above;
(c) 1/6 of the sum calculated pursuant to paragraph (iii) above;
(d) 1/12 of the sum calculated pursuant to paragraph (iv) above;

[12] S. R. & O. 1178 (1933).

shall be applied in two equal parts for the benefit of holders of ordinary shares and co-partners of the company.

The operation of these provisions may be illustrated as follows:

Total amount of gas sold = 1 million therms.
Ordinary price ..... = 8d per therm.

(a) 700,000 therms sold at prices varying between 8.0 pence per therm (the ordinary price) and 5.6 pence per therm (i. e., seven-tenths of the ordinary price) at an average price of 7.6 pence per therm realized a revenue of $7.6 \times 700{,}000 = 5{,}320{,}000$ pence. This is 280,000 pence less than the revenue which would have been obtained if all the 700,000 therms had been sold at the ordinary price, i. e., 8d per therm.

(b) 150,000 therms sold at prices less than 5.6 pence per therm and not less than 4.8 pence per therm (i. e., 3/5 of the ordinary price) at an average price of 5 pence per therm, realized a revenue of 750,000 pence. This is 450,000 pence less than the revenue which would have been obtained if all the 150,000 therms had been sold at the ordinary price, i. e., 8d per therm.

(c) 100,000 therms sold at prices less than 4.8 pence per therm and not less than 4.0 pence per therm at an average price of 4.5 pence per therm, realized a revenue of 450,000 pence. This is 350,000 pence less than the revenue which would have been obtained if all the 100,000 therms had been sold at the ordinary price, i. e., 8d per therm.

(d) 50,000 therms sold at prices less than 4.0 pence per therm realized in the aggregate 175,000 pence. This is 225,000 pence less than the revenue which would have been obtained if all the 50,000 therms had been sold at the ordinary price, i. e., 8d per therm.

The maximum amount which may be distributed in equal proportion between shareholders and co-partners is, therefore, the aggregate of

1/3	(280,000 pence)	=	93,333 pence.
1/4	(450,000 pence)	=	112,500 "
1/6	(350,000 pence)	=	58,333 "
1/12	(225,000 pence)	=	18,750 "
			282,916 "

Which equals approximately £1,180

6. SUMMARY AND CONCLUSIONS

Before 1875 the only form of dividend and price control was the prescription of a maximum price and a maximum dividend. Companies still subject to this form of regulation are entitled to make any charge for gas and to pay such dividends as the directors may recommend, provided that the prescribed maxima are not exceeded.

In 1877, however, the following standing order of the House of Commons was made:

> In the case of every such gas bill it shall be competent to the committee so to regulate the price of gas . . . charged . . . that any reduction of an authorised standard price shall entitle the company to make a proportionate increase of the authorised dividend, and that any increase above the standard price shall involve a proportionate decrease of dividend.

The modern form of sliding scale provision is as follows:

A standard rate of dividend and a standard price of gas per therm are prescribed. The company is entitled to charge a price above or below the standard, but the amount of dividend which it is permitted to pay will vary inversely with the price charged. If in the "prescribed period" the price charged for gas has been above the standard price, the dividend payable by the company for that period shall be reduced as follows:

	%		%	*In the* £100
On shares whose standard rate of dividend is	10	the reduction shall be respectively	.25	(5/–)
	7		.175	(3/6)
	5		.125	(2/6)

for each one-fifth penny (.4c) per therm or part thereof by which the *highest price* charged in the prescribed period exceeds the standard price.

Where, during the prescribed period the price charged for gas has been below the standard price, the dividend payable by the company for that period may exceed the standard rate of dividend in accordance with the scale above.

In view of the patent superiority of the basic system it is not surprising to note its growing tendency to replace sliding scale and maximum dividend provisions. In 1923 only four companies under statutory control were regulated by this method, whereas in 1933 twenty-one were so classified. The distribution at the end of 1933 was as follows:

	No.
Maximum Dividend Companies	178
Standard Price Companies	215
Basic Price Companies	21
Total number of companies under statutory control in England, Wales, and Scotland	414

Numerically, basic price companies do not appear important; but those twenty-one companies sold 51.5% of the gas and served 49% of the customers of statutory undertakers in the year 1933 in England, Wales, and Scotland (Table III). British authorities do not include the basic system under the heading of the sliding scale, but in the writer's opinion it is simply an improved method by which dividends payable are governed by prices charged, and should therefore be con-

TABLE I

CAPITALIZATION PER MILLION CUBIC FEET OF GAS SOLD BY COMPANY UNDERTAKERS IN ENGLAND, WALES AND SCOTLAND AS OF DECEMBER 31, 1933 [1]

	Proportion of borrowed funds to par value plus premiums of total capitalization (excluding surplus)	*Par value of paid up shares plus premiums*	*Par value of debt plus premiums*	*Cubic feet of gas sold (in millions) 1933*	*Share capital*	*Borrowed capital*	*Total capitalization*
					Per million cubic feet of gas sold		
	%	£	£		£	£	£
All Companies	29	94,320,829	38,807,509	184,477	511	210	722
Maximum Dividend Companies [2]	28	8,280,940	3,269,171	21,190 [2]	391	154	545
Standard Price Companies [3]	29.5	20,233,359	8,473,404	46,422 [3]	436	183	618

[1] Source: *Board of Trade Returns Relating to all Authorized Gas Undertakings in Great Britain for 1933.* Parts I and II.

[2] Only those maximum price companies whose sales amounted to more than 100,000MCF in 1933 were selected,—37 in all.

[3] Only those sliding scale companies whose sales amounted to more that 200,000MCF were selected,—53 in all. The limit was raised to 200,000MCF because there are more sliding scale companies: all told, there are 215 sliding scale companies and 178 maximum price companies, and the latter are generally smaller undertakings.

sidered in any attempt to develop a scheme of regulation embracing the sliding scale principle.

Capitalization of Gas Companies: Companies are required merely to show that capital proposed to be authorized is necessary and reasonable as to amount; but this requirement leaves a wide latitude of choice. Accordingly, capitalization per million cubic feet of gas sold has been computed for (a) all company undertakings; (b) a representative sample of maximum dividend companies; and (c) a representative sample of standard price companies, including in each case undertakers from England, Wales, and Scotland. (See Table I.) The conclusion to be drawn from the data presented in Table I is that although standard price undertak-

ings appear to be capitalized more conservatively and economically than are all companies on the average, they are more heavily capitalized than maximum dividend undertakings.

TABLE II

FREQUENCY DISTRIBUTION OF PRICES PER THERM [1] CHARGED TO ORDINARY CONSUMERS [2] AS OF DECEMBER 31, 1933 BY STATUTORY COMPANIES OF ENGLAND, WALES AND SCOTLAND [3]

Pence per therm	*Maximum dividend companies*	*Standard price companies*
7 to 7.99	xxxxx xxxx	xxxxx xxxxx
8 to 8.99	xxx	xxxxx xxxxx x
9 to 9.99	xxxxx xxx	xxxxx xxxxx xxxxx xx
10 to 10.99	xxxxx xx	xxxxx xx
11 to 11.99	xx	xxxxx
12 to 12.99	xxx	xx
13 to 13.99	x	x
14 to 14.99	xx	
15 to 15.99		
16 to 16.99		
17 to 17.99		
18 to 18.99	xx	
Average price computed from actual data	10.16d.	9.2d. per therm.

[1] All prices apply only to inner districts of cities. Discounts are not considered in these data.

[2] "Ordinary Consumers" are domestic customers who correspond to the typical American household consumer in that they own their gas appliances. Ordinary customers are to be distinguished from pre-payment consumers who use coin or slot meters and who must pay for the extra cost of collection and maintenance of the meter.

[3] Companies are the same as in Table I. Source: same as in Table I.

Prices: In the last analysis great weight must be given to the level of prices in appraising the relative merits of any system of regulation. Neither Whitten [13] nor Morgan [14] in

[13] *Op. cit.*, p. 906 *et seq.*

[14] *Op. cit.*, p. 169.

their earlier studies of the sliding scale in Great Britain was able to draw definite conclusions as to the relative merits of the scheme from the standpoint of prices. The data in Table II, however, seem to indicate a slight advantage in favor of the standard price companies, whose charges on the average appear to be 9.5% lower than those of maximum dividend companies. This may be due in part to the fact that the latter are, generally speaking, smaller undertakings which may not on that account be able to produce under relatively advantageous conditions. It is pointed out by Mr. Stemp,[15] moreover, that the tendency is for maximum dividend companies to maintain a higher price than sliding-scale companies and to " utilize a considerable portion of revenue for maintenance, repair, renewal, and extension of works, plant and machinery." This is alleged also to explain in part the fact that " the amount of capital [capitalization] of such companies is relatively lower than that of standard price companies." (See Table I.) This point of view is further borne out by the fact that standard price companies, as a class, seem to pay higher dividends on their shares than do maximum dividend companies.

On the whole, prices charged by private companies compare favorably with those of public plants. Unweighted average prices charged by private companies for domestic lighting, heating, and cooking service in the early part of 1934, in comparison with those charged by Local Authorities (i. e., municipally owned plants) are as follows:

	Pence per Therm[16]
Maximum Dividend Companies	10.16
Standard Price-Standard Div. Co's.	9.2
Basic Price Companies	8.55
Local Authorities	8.82

[15] See footnote at beginning of this chapter.

[16] It is customary for some of the larger establishments to vary the price of gas according to conditions of use. But as the published data

Attitude of the Industry toward the Sliding Scale: The British gas industry apparently feels today that the sliding scale in its original, relatively inflexible form is ill-adapted to present conditions in which gas is no longer used mainly for lighting but principally for cooking and heating. Competition from electricity and oil, it is maintained, serves therefore to regulate the price of gas. The basic system is admitted to have many advantages, but is not in universal favor because of its inherent complexity and the inability of consumers to understand its operation. Accordingly, producers are urging the imposition of a reasonable maximum dividend and price with certain safeguards, thus allowing companies to carry on their undertakings with " ordinary commercial prudence."

TABLE III

BASIC PRICE COMPANIES IN ENGLAND, WALES AND SCOTLAND AS OF DECEMBER 31, 1933

Name	*Total Gas sold 1933 MCF*	*Number of Customers*
Bath	1,279,067	27,062
Cardiff	1,729,444	61,813
Chester	442,449	14,724
Commercial	3,370,738	116,184
Dover	190,929	9,919

do not indicate the respective quantities taken at these varying prices, the author has used an arbitrary figure in such cases. Thus, where the range is from say, 8.6d. to 4.5d., a figure such as 7.8 d., which is closer to the upper limit, would be recorded.

Only those establishments whose sales amounted to more than 200,000,000 cubic feet in 1933 were taken in all four categories.

Private or company plants produce on the average about 1.4 times as much gas per plant as do those owned and operated by Local Authorities. Generally speaking, Maximum Dividend companies are relatively small; Standard price and Local Authority establishments rank next in size, while Basic Price companies are among the largest in the British Isles.

Source: Same as for Table I.

Dudley B. H.	457,806	21,672
Gas Lt. & Coke	48,099,617	1,485,370
Grantham	136,536	6,164
Harrogate	570,079	20,742
Kidderminster	228,822	8,418
Newcastle/Tyne	4,996,765	205,641
Romford	630,021	24,475
Scarborough	632,729	15,044
Sheffield	5,232,784	150,155
South Met.	14,954,278	433,764
So. Suburban	4,381,937	165,348
Sunderland	1,285,059	56,778
Swansea	608,760	35,043
Wandsworth	5,276,534	160,843
Weymouth	260,636	7,632
Windsor Royal	160,428	4,796
	94,925,418	3,031,587
Per cent of *all* Company Undertakings	51.5%	49%

Source: Board of Trade, *Return*, etc., same as for Table I.

TABLE IV

COMPARATIVE IMPORTANCE OF COMPANY UNDERTAKINGS (PRIVATELY OWNED) AND LOCAL AUTHORITY UNDERTAKINGS (PUBLICLY OWNED) AS OF DECEMBER 31, 1933 IN THE GAS INDUSTRY OF GREAT BRITAIN

(a) *Companies*

	Number	*MCF Sold*	*%*	*Customers*	*%*
England and Wales	409	183,893,059		6,179,134	
Scotland	4	583,487		25,214	
Sub total	413	184,476,546	64.5	6,204,348	62.

(b) *Local Authorities*

England and Wales	247	79,528,119		2,958,050	
Scotland	67	22,139,684		849,981	
Sub total	314	101,667,803	35.5	3,808,031	38.
Total	727	286,144,349	100.	10,012,379	100.

Source: Board of Trade, *Return*, etc. Same as for Table I.

CHAPTER III

The Sliding Scale in the Electric Industry of Great Britain [1]

I. THE SLIDING SCALE IN EARLY LEGISLATION

On March 28, 1879, Parliament instructed a Select Committee to formulate certain principles to be followed when local authorities or private companies sought authorization "to supply light by electricity." This committee, however, did not make any specific recommendations, and no legislation followed. Consequently, in 1882, when twenty-four petitions for electricity supply privileges were before Parliament, it became necessary to take legislative action. The result was the Electric Lighting Bill of 1882.

One of the more significant features of this Act was a provision to the effect that

> At the expiration of 21 years from the date of the [an] order, and at every subsequent seven year period, the [a] local authority . . . might . . . purchase the [an] undertaking at the

[1] In this discussion, I have drawn heavily upon an unpublished thesis written by Dr. S. P. Langhoff, Jr., formerly Fellow in Economics at the University of Illinois. Dr. Langhoff spent the latter half of the year 1933 in Great Britain where he investigated the British system of regulating the electricity supply industry.

I was assisted further by Sir John Brooke, Secretary to the Electricity Commission, London; and Sir Andrew R. Duncan of the Central Electricity Board, London. Both of these gentlemen gave patient consideration to my long and tedious letters, and submitted private memoranda on obscure points.

"then value"[2] of the property but without any addition in respect of compulsory purchase or of goodwill. . . .

Four years later (1886) when a select Committee was taking evidence on ways and means of making the Electric Lighting Act of 1882 more effective, the sliding scale was suggested, by some as a substitute for, and by others as a supplement to, the purchase rights clause mentioned in the preceding paragraph. But the sliding scale was not incorporated in the Act of 1888.

The statutes regulating distribution undertakings have remained fundamentally the same since 1888, the salient characteristics being (a) the right of purchase; and (b) the direct limitation of price. In practice, however, says Langhoff, "the right of compulsory acquisition has had more influence in securing a 'fair' price than has any other section of the Acts".

In 1893, a sliding scale provision was made one of the conditions under which a municipally operated plant at Chiswich was transferred to a private company. The terms of the agreement were such that whenever the company was in position to pay a dividend of more than 10%, one-half of the surplus remaining after payment of the 10% dividend should be applied in reducing the price charged for electricity.[3]

[2] The "then value" has been defined as "such a sum as it would cost to reconstruct and establish" the property, "deducting a proper sum in respect of depreciation . . . but taking into account the fact that" the property is "successfully constructed and in complete working condition. . . ." The date applicable is that of the notice of purchase. (Langhoff, pp. 14 and 68, citing Will's *Law Relating to Electricity Supply* (London, 1932), pp. 153-154).

In 1888, a Bill extended the 21-year purchase rights clause to 42 years with the purchase option recurring every ten years thereafter, instead of every seven.

[3] This is closely analogous to the scheme adopted thirty-one years later in Washington, D. C. by the Public Utilities Commission and the Potomac Electric Power Company. See Chapter VIII.

2. SLIDING SCALE LEGISLATION AMONG THE POWER COMPANIES

In or about the year 1898, (when economical transmission of electricity over wider areas became practicable) numerous applications were made to Parliament for authority to supply electric energy in bulk to authorized undertakers. The proposals, which contained important departures from practices of the past, were considered by a Joint Committee, under the Chairmanship of Viscount Cross, during the Session of 1898. The committee stated that it thought the provisions of the Electric Lighting Act of 1888, which enabled a local authority to purchase an undertaking after a lapse of years, inapplicable as a general rule to an undertaking supplying energy in bulk at high voltages. Accordingly, when a number of power companies were incorporated by Special Acts, somewhat later, and were given powers of supply over large areas, they were not made subject to purchase by local authorities, but were placed under sliding-scale provisions which usually took one of the two following forms:

(1) According to one, the dividend is subject to an increase of 5/ in the £100 (.25%) for every 1.25% by which the prices actually charged in any year are below the *maximum* prices fixed by the Act.[4]

(2) According to the second type, the dividend is subject to an increase of 5/ in the £100 (.25%) for every 1.25% by which the average price per unit in any year was less than the *standard* price.[5]

[4] Also, if the dividend in any one year exceeds the rate fixed by the Act, the charges for the *next* year must be 1.25% below the maximum price fixed for every 5/–% by which the dividend exceeded the rate fixed.

[5] Conversely, if the average price exceeded the standard price, the rate of dividend must be reduced 5/–% for every 1.25% by which such price exceeded the standard. See Table V.

During the world war increased consumption of electricity emphasized the need for reform and coordination of Britain's antiquated electricity supply system. Three committees of Parliament investigated the industry, the most significant investigating group being the Williamson Committee, which recommended in 1918 that a widespread and coordinated system of generation and bulk transmission be built by a national electricity commission, leaving local distribution systems in the hands of existing undertakers. But the bill embodying these proposals was shorn of its most important provisions, so that when enacted as the Electricity (Supply) Act, 1919, it did not give the Electricity Commissioners necessary powers to carry out the program. The Act of 1922, moreover, was only a little better in this respect, being a mere gesture toward reinforcement of the law.

During the five years 1919-1924, the Electricity Commissioners provided for in the Act of 1919 struggled against odds to bring some degree of order out of the chaotic condition of Britain's electrical industry. Although not very successful in this respect, they accumulated a mass of useful information which a new parliamentary committee in 1925, under Lord Weir of Eastwood, used to good advantage. Indeed, the electricity (Supply) Act of 1926 grew out of the recommendations of this body.

Although most students of the power problem are familiar with this Act, it may not be amiss to recall its principal features: briefly, it provided for the appointment of a Central Electricity Board consisting of eight men, corresponding roughly to the New York State Power Authority and the Tennessee Valley Authority in the United States. The Board was empowered in the Act to construct or acquire a national network of high-tension transmission lines (known as the Grid-iron, or Grid) to connect selected generating stations, while less efficient stations were to be shut down. The Act

TABLE

POWER COMPANIES

Dividends

1 Name of Power Company	2 Standard rate of Dividend	3 1932 Ordinary Dividend Gross *	4 Percentage on capital exp. of total amount paid in interest and dividends (Average 3 years)
Lancashire E. P. Co. (owned by Lancs. E. L. & P. Co.)	8%	4.43%	5.26%
North Met. E. P. S. Co.	8%	10%	4.84%
South Wales E. P. Co.	8%	—	3.30%
Metropolitan E. S. Co.	Nil	10%	9.21%
Clyde Valley E. P. Co.	8%	7%	5.5%
Derby & Notts. E P. Co. (owned by Midland Counties E. S. Co.)	8%	8.75%	6.43%
Yorkshire E. P. Co.	8%	8%	6.06%
Kent E. P. Co.	8%	10%	4.57%
Leicester & Warwick E. P. Co. (owned by Midland Counties E. S. Co. Ltd.)	8%	6.56%	6.47%
Fife E. P. Co.	8%	6½%	4.0%
Scottish Central E. P. Co.	8%	6⅝%	5.9%
Shrops. Worcs. & Staffs. E. P. Co.	10%	8% on A Shares 5% on B Seares =5.46% Av.	5.72%
Lanarkshire Hydro E. P. Co.	8%	8%	3.0%

V

IN GREAT BRITAIN
and Prices

5 Slide	6 Standard Prices	7 Present Average prices of energy (Bulk † and Power) Year 1932. Pence per unit ‡ sold	8 Approximate Authorized Rate of Div.
5/—% increase for 1¼% decrease in maximum prices	(Max. Pr.) 4d. 1st 100 hrs. 2d. 2nd 100 hrs. 1d. unit thereafter	0.548	17% at least
do (Sliding scale applies to power only)	do	0.825	11½% at least
5/—% per 1¼% (variation+or—in Standard Price of 1½d.)	1½d.	0.622	19¾%
None	London Acts		—
5/—% per 1¼% (variation+or—in Standard Price of 2½d.)	2½d.	0.677	23%
5/—% per 1¼% (variation+or—in Standard Price of 2½d.)	2½d.	0.606	23%
4/—% increase per 1¼% (decrease in max. prices)	(Max. Pr.) 3d. 1st 100 hrs. 2d. 2nd 100 hrs. 1d. per unit thereafter	0.711	12 6% at least
4/—% per 1¼% (variation+or—in Standard Price)	3d.	0.421	21.75%
do	2½d.	0.927	18%
do	2½d.	1.438	14¼%
4/—% increase or 5/—% decrease per 1¼% (variation+or—in Standard Price)	2½d.	0.932	18%
5/—% per 1¼% (variation+or—in Standard Price)	2½d.	0.845	23¼%
5/—% per 1¼% *below* average price of 1d.	1d.	0 141	25%

TABLE

1 Name of Power Company	2 Standard rate of Dividend	3 1932 Ordinary Dividend Gross *	4 Percentage on capital exp. of total amount paid in interest and dividends (Average 3 years)
North Eastern E. S. Co.	8%	6%	5.04%
Lochaber Power Co.	—	—	1.6%
B. C. H. Company	Nil	—	3.32%
London Power Company	—		
West Kent	8%	10%	4.15%
Cornwall E. P. Co. (owned by Urban Co.)	10%	Nil	1.22%
Lothians E. P. Co.	8%	3%	3 7%
Grampians E. S. Co.	Nil	6% approx.	3.6%
North Wales Power Co.	10%	3½%	3.67%

* i. e., Dividend on Ordinary shares (similar to American Common Stock).

provides that the energy be purchased by the Board at cost, and re-sold at the so-called grid tariff (or under special conditions where the purchaser is also the producer, at adjusted station cost).

Prior to passage of the Act of 1926, sliding-scale provisions had been applied in the main, only to power companies

V—(*Continued*)

5 Slide	6 Standard Prices	7 Present Average prices of energy (Bulk † and Power) Year 1932. Pence per unit ‡ sold	8 Approximate Authorized Rate of Div.
(Co. of Durham) 5/—% increase per 1¼% decrease in *Max.* Price	(Max. Price) 4d. 1st 100 hrs. 2d. 2nd 100 hrs. 1d. per unit thereafter	0.531	17% at least
(Cleveland and Durham) 5/—% per 1¼% (variation+or—Standard Price)	2½d.		
Nil		No power or bulk supplies 1932	—
Nil	—	0.769	—
Nil	—	—	—
4/—% per 1¼% (variation+or—in Standard Price of 3d.	3d.	0.701	20%
5/—% increase per 1¼% decrease in Max. Price	3d. 1st 100 hrs. 2d. 2nd 100 hrs. 1d. unit thereafter	1.233	13⅓%
4/—% per 1¼% (variation+or—in Standard Price)	2½d.	1.026	17⅓%
—	—	—	—
5/—% per 1¼% (variation+or—in Standard Price)	1½d.	0.736	20%

† Bulk power refers to that sold under company interchange contracts.

‡ A unit consists of the amount of energy contained in a current of 1000 amperes flowing under an electro-motive force of 1 volt during one hour.

(and after 1925, to companies distributing electricity in London). But among the power companies, the sliding scale had been inoperative for years, because improved conditions of production, which enabled companies to sell energy

materially below the standard or maximum prices, *authorized* the payment of larger dividends than earnings of the companies in most cases, would permit, and public opinion would tolerate. For example, according to the 1932 average prices charged for bulk energy and power, the companies shown in Table V were *authorized* by the terms of the sliding scale provisions under which they were operating, to pay the rates of dividend appearing in column 8. Neither earnings nor public opinion would allow the payment of such large amounts.[6]

Notwithstanding the fact that the sliding scale among power companies has been virtually inoperative, an attempt is made in Sections 32 and 39 of the Act of 1926, (although primarily affecting power companies) to retain and reinforce the sliding scale by applying it to *distributing* companies which receive a supply from the Grid. For example, Section 32 of the Act of 1926 reads,

Where any company (being an authorized undertaker and not being a power company) receives a supply of electricity either directly or indirectly from the Board, the Electricity Commissioners . . . (having regard to any change in the cost of electricity to the company attributable to this Act) . . . may make provision as to the relation between the charges to be paid for electricity, and the dividends to be paid by the company. . . .

[6] The companies, however, cannot claim any right to make up the deficiency arising from the fact that the actual dividends (Columns 3 and 4, Table V) have been less than authorized dividends, for Section 31, Sub-section 2, of the Act of 1926 provides that "Where a special Act passed before this Act authorizes . . . a power company to make good any deficiency in any previous dividends which have fallen below the prescribed standard rate of dividends, the Electricity Commissioners may . . . make provision for the repeal or limitation of any such authorization. . . . " It is to be noted here that, as worded, the provision applies to cases where the actual rate of dividend has fallen below the prescribed *standard* rate. It may be inferred, therefore, that if the companies have no vested right in the standard rate of dividends, they have none in authorized dividends above the standard, payable under the sliding scale.

The other sliding-scale provision of the Act of 1926 is found in Section 39. In order to understand the significance of this part of the Act, however, it is necessary first to look into earlier legislation and conditions. As the advantages of wider areas of distribution became apparent with the growth of the industry, it became more or less common under the legislation of 1919 and 1922 to suspend the power of purchase which was theretofore vested in local authorities, where the exercise of such purchase rights would tend to disintegrate supply areas. Therefore, the Commissioners were empowered, under these earlier acts, to introduce sliding-scale provisions in the Orders governing the companies affected, when such purchase rights were suspended.

Section 39 of the Act of 1926 carries this policy a step further. When an area is supplied by two or more undertakings, each of which is subject to purchase individually by the local authority concerned, the provisions of Section 39 allow purchase by a *single* authority at defined periods after an initial tenure not exceeding fifty years. Special Orders made under Section 39 *may* include a sliding scale provision; the Electricity Commissioners have decided, as a part of their normal policy, that all such Orders *shall* include sliding-scale provisions.

The terms of such Orders differ slightly in detail but a typical clause is as follows:

> . . . if in any year the divisible profits, (after providing a sum for reserve not exceeding a specified percentage on the capital, and a sum [if any] required to make good a past deficiency . . .) were in excess of a sum equivalent to the standard rate of profit, the maximum prices which might be charged for electricity supplied to ordinary consumers during the immediately succeeding year should not exceed the standard tariff reduced by certain percentages dependent upon the percentage by which the standard rate of profit had been exceeded.

3. EARLY SLIDING SCALE LEGISLATION AMONG THE DISTRIBUTING COMPANIES

Among the lighting companies (as distinct from power systems) a slightly different form of sliding-scale provision was incorporated in Orders granted by the Board of Trade during the first decade or so of the present century. Usually the local authority required that when Orders were issued to company undertakers, some provision be made for a reduction in the price of energy if dividends or profits exceeded a stated percentage on issued or paid-up capital.[7] The Aldeburgh, and the Portishead & District Orders for example, provided that if the companies paid a dividend exceeding 5% per annum on the paid-up share capital, the price charged in the ensuing twelve months was to be reduced by one-eighth of a penny per unit for power and heating, and by one-quarter of a penny per unit for lighting and other purposes, for each 1 per cent by which the dividend so paid exceeded 5%.

Another type of clause which in effect places a maximum limit upon the dividend a company may pay, is contained in the Sevenoaks and District Electric Lighting Order, 1913 (granted by the Board of Trade), section 7 of which provides that in the event undertakers make in any one fiscal year a profit which would enable them, after meeting all charges including depreciation, to pay a dividend in excess of 10% that year on the entire issued and paid-up capital the undertakers must in the following year make such reduction in the price charged for electricity either to all or any class of consumers as would be sufficient to reduce the profits for that year to 10%.

[7] See Aldeburgh Electric Lighting Order, 1911; and Portishead & District Electric Lighting Order, 1911.

4. THE SLIDING SCALE (BASIC SYSTEM) AMONG THE LONDON COMPANIES

We must turn to London to get an up-to-date picture of the sliding scale among British electric companies.

The franchises under which London companies formerly operated, teminated in 1931, at which time the London County Council had the right of purchase. The companies on the other hand sought to renew their franchises. This gave the County Council a substantial measure of bargaining power, which it used in effecting the following compromise: (1) the Council established a Joint Electricity Authority for the London District; (2) dividends on ordinary shares were limited to 7% plus a bonus not to exceed one-sixth of the difference between the actual charges to consumers and the charges for the same volume at standard prices (a sliding-scale provision); (3) in return for these concessions, the companies were given an extension of their franchises to December 31, 1971. On that date the undertakings are to be transferred to the Joint Electricity Authority.

These and other provisions were embodied in the London Electricity (No. 1) and (No. 2) Acts, 1925. As our interest is primarily in the sliding scale, an analysis of the Acts as a whole will not be undertaken. We pass on, therefore, to an investigation of the operation of the sliding scale among the London Companies.

Under the Acts of 1925, each London Company must fix its basic or standard prices [8] and submit them to the London and Home Counties Joint Electricity Authority for approval. If the Authority withholds its approval, basic prices must be set by the Electricity Commissioners, or an arbitrator appointed by them.

[8] The London Electric companies operate under the basic system, not the standard price-standard dividend arrangement. It is unfortunate that the Act of 1925 uses the terms "basic price" and "standard price" as if they were interchangeable.

A basic price is set for each class of service,—private consumers, street lighting, bulk supplies, and railway and traction service. A distinct set of basic prices, moreover, is determined for each company.

The level of basic prices is governed by the general provision that " when applied to the units sold in the last completed year prior to the fixing of the basic prices they shall provide sufficient revenue to meet " the ordinary, normal costs of production including dividends at the standard rate.

Table VI presents basic prices for the years 1926 and 1932. It is evident from this table that price reductions have been substantial.[9]

TABLE VI

BASIC PRICES PER UNIT[1]

(*London Companies*)

Name of Company	*Private Consumers*[2]	
	1926	*1932*
	d.	*d.*
Brompton and Kensington	4.604	2.657
Charing Cross		
City Undertaking	3.105	
West End Undertaking	3.459	
Chelsea	4.425	
City of London	3.069	
County of London	2.887	2.265
Kensington & Knightsbridge	3.004	1.643
London Electric Supply	2.215	1.674
Metropolitan	3.680	
Notting Hill	4.168	3.065
St. James & Pall Mall	2.917	1.850
South London Supply	2.562	1.834
South Metropolitan	2.011	1.294
Westminster	2.766	

Note: 1932 standard prices for several companies had not been agreed upon when this table was drafted.

[1] A unit consists of the amount of energy contained in a current of 1000 amperes flowing under an electro-motive force of 1 volt during 1 hour.

[2] Includes Power Consumers.

Source: Supplied by Electricity Commission, January, 1934.

[9] But see Table XIV for a comparison of sliding scale and non-sliding scale companies.

The Consumers' Benefit: If the volume of consumption and the respective prices in the ensuing year were equivalent in all respects to those of the base year, the company's revenue would be sufficient to meet the expenses of production (as defined) and no more. Under normal circumstances, however, the consumption of electricity increases from year to year and prices tend to decline not only because of price reductions made by the companies, but also because increased consumption under ordinary price schedules generally reduces the *average* price to the consumer. The London Acts of 1925 provide, therefore, that

> If in any year the total of the amounts actually charged to consumers for current supplied is less than an amount arrived at by applying the appropriate standard (basic) prices to the number of units supplied during the year, the difference shall be described as "consumers' benefit" and (subject to the profits being available) a sum equal to one-sixth of such consumers' benefit may be used for purposes of additional dividend for the ordinary shareholders and/or for accumulation of reserves; and it shall be competent for the companies to apply for the benefit of co-partners[10] such a share of surplus profits (not exceeding one-sixth of the consumers' benefit in the years up to and including 1931) as may be allowed under any co-partnership scheme approved by the Commissioners. . . .

In view of its importance we shall analyze the method of computing the consumers' benefit, utilizing the formula in the North Metropolitan Company's draft order.[11]

Consumers are divided into the six classes shown in column 1 of Table VII. In this particular illustration, 1930

[10] i. e. Employees. See page 59 *et seq.*

[11] Concerning this calculation, Dr. Langhoff said, when he read the MS, "In electing to demonstrate the computation of consumers' benefit . . . you may have assumed too great a burden as it is a most complicated arrangement . . . though I think you have handled it admirably."

TABLE VII

Method of Calculating Consumers' Benefit

1 Class of Consumer	2 Number of Units Sold in 1930	3 Average Price Rec'd. Per Unit	4 Product of Col. 2 × Col. 3	5 Assumed No. of Units Sold in 1931	6 Assumed Average Price Rec'd Per Unit	7 Product of Col. 2 × Col. 6	8 Product of Col. 5 × Col. 6
		d.			d.		
(1) Lighting (separately metered from heating and cooking)	8,293,000	4.29	35,576,970	10,293,000	4.00	33,172,000	41,172,000
(2) Heating and / or cooking (separately metered from lighting)	1,996,000	1.35	2,694,600	2,000,000	1.33	2,654,680	2,660,000
(3) Combined lighting, cooking and heating.	5,454,000	1.67	9,108,180	5,700,000	1.64	8,944,560	9,348,000
(4) Power	7,957,000	1.39	11,060,230	8,200,000	1.34	10,662,380	10,988,000
(5) Public Lighting	525,000	2 70	1,417,500	600,000	2.69	1,412,250	1,614,000
(6) Supplies to Company's Premises	1,238,000	0.58	718,040	1,400,000	0.57	705,660	798,000
Totals	25,463,000		60,575,520	28,193,000		57,551,530	66,580,000
Weighted Averages		2.38			2.26		

(60.6/25.5=2.38) (57.6/25.5=2.26)

28,193,000×2.38=67,099,340d.
28,193,000×2.26=63,716,180d.

3,383,160d. or

£14,096 10s.

serves as the base year. The respective amounts of energy consumed by the various classes of customers are indicated in column 2, and the average prices in column 3. The weighted average price of energy consumed in 1930 is 2.38d, shown at the bottom of column 3. Since 1930 is the base year, 2.38d is the basic or standard price per unit.

To determine the amount of consumers' benefit accruing in the following year (1931) it is necessary first to compute the *actual* price charged that year. This is done by applying to the number of units shown in column 2 for each class of customer, the average price per unit charged each class of consumer in 1931 (Col. 6) thus giving the products in column 7. The sum of these products divided by 25,463,000 gives a price in 1931 of 2.26d per unit.[12]

Then the total number of units sold in 1931 (28,193,000) is multiplied (1) by the standard price (2.38), and (2) by the actual price (2.26), and the difference between the two products so determined " shall, where the actual price is less than the standard price, be the consumers' benefit," which in this illustration amounts to £14,096 10s., obtained thus:

$$28{,}193{,}000 \times 2.38 = 67{,}099{,}340$$
$$28{,}193{,}000 \times 2.26 = 63{,}716{,}180$$
$$3{,}383{,}160\text{d., or £14,096 10s.}$$

When the supply to a new class of consumers amounts to 10% or more of the total units sold, the new class may be entered in column 1, and a new basic price is then computed.

Furthermore, Section 7 of the Sliding Scale Schedule to the London Acts of 1925 provides that " if at any time it is shown to the satisfaction of the Commissioners that the costs and charges of, and incidental to, the generation and distribution of electricity, have substantially altered . . ."

[12] In the absence of actual figures, those in column 6 are hypothetical. Nevertheless they illustrate the method of computation.

the Commissioners (on application of (1) the undertakers; (2) not less than 20 consumers; or (3) the Joint Electricity Authority) may " . . . make an order correspondingly varying the standard prices or methods of charge."

TABLE VIII

TOTAL BONUS APPROPRIATED TO SHAREHOLDERS

1928-1931 (INCLUSIVE)

As percentage of ordinary shares

Name of Company	*Total Bonus*
	%
Brompton & Kensington	10.60
Charing Cross	
City Undertaking	17.03
West End Undertaking	8.12
Chelsea	*
City of London	22.46
County of London	*
Kensington & Knightsbridge	14.38
London Electric Supply	30.42
Metropolitan	*
Notting Hill †	(12.25)
St. James & Pall Mall	13.60
South London Supply	*
South Metropolitan	*
Westminster	11.02

* Not available.

† Number shillings per deferred share.

Source: Annual financial statements of the companies.

No further revision may be made until the expiration of three years.

Dividends: After 1931 (when the new franchises took effect) the standard rate of dividend on the ordinary shares (subscribed in cash or issued for an equivalent consideration); on ordinary shares created by the capitalization of free reserves; and on new ordinary shares subscribed for cash, may not exceed 7%.

Shareholders' Bonus: The divisible or retainable profit in any year is the amount represented by the standard dividends,

plus a sum equal to one-sixth of the amount of the consumers' benefit (if available). The latter portion, if not paid as additional dividend to the stockholders, may be added to the reserves and " shall be applicable in or towards the payment of dividends in any year . . . in which the profits are insufficient to pay the authorized rates of dividend on the

TABLE IX

PERCENTAGE REDUCTIONS IN AVERAGE PRICES CHARGED OVER PERIOD 1925-1931

Name of Company	*Lighting & Domestic*	*Public Lighting*	*Power*	*Bulk*	*Total*
	%	%	%	%	%
Brompton & Kensington	46.2	50.0	41.8		46.5
Charing Cross					
City Undertaking	32.4		32.2		35.4
West End Undertaking	30.8	7.6	13.7		25.9
Chelsea	37.2		31.9		36.1
City of London	31.7	19.1	28.2		32.0
County of London	51.9	40.7	41.8	56.2	64.3
Kensington & Knightsbridge	43.0	48.8	67.7		45.5
London Electric Supply	48.1	61.4	13.3	23.1	46.3
Metropolitan					
Notting Hill	27.9	37.5	35.6		29.8
St. James & Pall Mall	36.7		52.4		36.9
South London Supply	51.6		40.5		47.3
South Metropolitan	56.7		46.3	31.5	45.3
Westminster	38.8	7.3	24.0		29.6
Totals—London Co's.	43.9	56.9	33.8	42.3	56.7
Totals—Extra-London Co's.	46.0	3.3	45.4	32.4	39.5
Totals—All Companies	44.1	16.5	38.9	41.3	53.5

Source: Computed from data given in *London and Home Counties District: Electricity Supply*, vol. i, 1925-26-27, and vol. vi, 1931-32.

ordinary capital, or in or towards increasing beyond the authorized rates, the dividends on ordinary capital . . . or to any other purpose which the company may think fit[18] except that a deficiency in dividends of previous years (if

[18] London (No. 1) Act 1925, Sliding Scale Schedule, Par. 8, "Reserve Funds". For a discussion of the method of disposing of excess profits which are not divisible or retainable, see p. 57 *et seq.*

any) may not be made up out of this reserve. Any balance in the fund at the end of the year 1971 shall belong to the company.

After 1931 the companies capitalized the free reserves which they had accumulated as Stockholders' Bonus and most of them distributed the bulk of it as ordinary share capital among ordinary shareholders, in proportion to their holdings. Several companies, however, allocated blocks of shares to their employee pension funds. Bonuses paid to ordinary shareholders for the years 1928-1931 are shown in Table VIII. We note here that one company (London Electric Supply) paid during the four years 1928-1931 a total bonus of 30.42% of its ordinary share capital. The lowest total bonus paid was 8.12% (Charing Cross West End Undertaking), and the average for the eight companies reporting, for the four years, was 16% of ordinary share capital.

Price Reductions, Dividends and Shareholders' Bonus: During the six years ended December 31, 1931, the average price among the London companies for all classes of consumption was reduced 56.7% (Table IX). Reductions for individual classes were as follows:

	%
Lighting and Domestic	43.9
Public Lighting	56.9
Power	33.8
Bulk	42.3

Comparing bonus dividends for the years 1928-1931 inclusive (Table VIII) we note that the companies which paid the largest bonuses are not the ones which reduced prices most drastically (Table IX). Kensington & Knightsbridge paid an average annual bonus of 14.38% (three other companies having paid larger amounts) but lowered prices 45.5%. Brompton and Kensington paid a smaller average

annual bonus (10.6%) and reduced prices 46.5%. However, shareholders' bonus, and price reductions are not strictly dependent variables: the amount of consumers' benefit is governed by the volume of consumption as well as by price; furthermore, the rate of dividend on ordinary shares is a function of the capital structure of the company (i. e. the proportion of ordinary shares to other forms of securities in the financial set-up). Finally, a drastic reduc-

TABLE X

SHAREHOLDERS' BONUS AS PERCENTAGE OF AVERAGE UNIT CHARGE

Name of Company	*1928*	*1929*	*1930*	*1931*
	%	%	%	%
Brompton & Kensington	3.86	8.06	9.62	6.24
Charing Cross				
City Undertaking	6.40	8.95	6.89	3.78
West End Undertaking	3.96	5.67	6.72	7.61
Chelsea	3.28	5.11	6.67	
City of London	6.06	7.41	8.43	7.18
Kensington & Knightsbridge	4.39	5.69	5.85	8.12
London Electric Supply	7.34	4.80	8.11	8.44
Metropolitan	12.18	10.77	9.95	11.85
Notting Hill	0.83	3.12	3.58	3.97
St. James & Pall Mall	4.12	6.95	8.15	8.47
South London				
South Metropolitan				
Westminster	5.09	4.65	5.30	6.74

Sources: Annual financial statements of the several companies.

tion in prices may so deplete the net revenue as to leave insufficient funds to pay the authorized bonus. Doubtless one reason why the Brompton and Kensington Company paid a comparatively low rate of bonus is the fact that this company has raised 98.5% of its capital through the issue of ordinary shares (common stock). Conversely the City of London Company (whose shareholders enjoyed the second largest rate of bonus payments) was capitalized, as of 1931, by means of ordinary shares to the extent of only 41.5%. Thus, the rate of bonus dividends is not a dependable index

of the reward accruing to the shareholders as a result of price reductions.

A ratio of shareholders' bonus to total revenue received from the sale of energy is a better measure of the relative amount of bonus. Table X presents such ratios (which indicate as well the cost to consumers of the stockholders' share of the consumers' benefit) in terms of percentages of the average price per unit. To take a concrete case, by the year 1931, the 46.3% reduction below 1925 prices, made by the London Electric Supply Company was costing the customers

TABLE XI

AMOUNT CARRIED FORWARD AS A PERCENTAGE OF THE ALLOWED MAXIMUM

Name of Company	*1928* %	*1929* %	*1930* %	*1931* %
Brompton & Kensington	53.7	20.0	5.0	0.0*
Charing Cross				
City Undertaking	27.2	0.0*	0.0*	0.0*
West End Undertaking	77.7	85.5	91.0	91.9
Chelsea	65.2	58.2	18.3	17.4
City of London	4.6	4.2	6.1	0.0*
County of London				
Kensington & Knightsbridge	34.4	6.9	3.0	0.0*
London Electric Supply	24.2	44.6	52.2	44.7
Metropolitan	49.8	39.0	60.6	45.8
Notting Hill	92.4	82.1	91.7	99.2
St. James & Pall Mall	187.4	167.6	125.3	83.2
South London	217.5	225.4	135.2	43.4
South Metropolitan				
Westminster	21.4	18.8	21.9	0.5*

* Allowed Shareholders' Bonus not fully appropriated.

Sources: Amount Carried Forward: Annual financial statements of the several companies.
Allowed Maximum: *London and Home Counties Electricity District: Electricity Supply*, vols. iii-vi.

of that company 8.44% of the price they were paying for electric energy. Due to a reduction in earned profits between 1930 and 1931, the Brompton and Kensington Company was compelled to reduce the shareholders' bonus from

9.62% of the gross revenue in 1930, to 6.24% in 1931. The same explanation applies to the City of London Company's reduction from 8.43% to 7.18% (Table X).

As indicated above, the shareholders' bonus is a reward of recurring character and may authorize the payment of larger dividends than earnings permit. This is the situation among the power companies today. (See Table V).

Charges Carried Forward: Paragraph 6 of the sliding scale schedule to the London Acts of 1925 provides that

> If the clear profits of any company in any year amount to a larger sum than is sufficient to pay dividends at the standard rates plus one-sixth of the consumers' benefit [14] and any share [14] of surplus profits [14] applied for the benefit of co-partners as aforesaid, the excess shall be carried forward to the next following year:
>
> Provided that the total sum carried forward shall not exceed at any time, 12 months' interest on the preference capital and dividends at the standard rates on the issued ordinary capital.

The amounts which the companies have carried forward, expressed as a percentage of the allowed maxima, are given in Table XI for the four years 1928 to 1931. Two of the companies (St. James & Pall Mall, and South London) have accumulated substantial excesses above the allowed maxima. Although no provision is made in the Acts for disposing of an excess balance, "the South London Company was required to make rebates to consumers amounting to £36,852 in 1930, and £23,195 in 1931." [15] Appropriate disposition of the St. James & Pall Mall Company's excess had not been decided upon when Langhoff made his investigation. Since the amount carried forward in a given year represents, for the most part, a sum which the company may not appropriate

[14] If any.

[15] Langhoff.

TABLE XII

AMOUNT APPROPRIATED TO SHAREHOLDERS' BONUS AS PERCENTAGE OF AMOUNT ALLOWED

Name of Company	*1928*	*1929*	*1930*	*1931*
	%	%	%	%
Brompton & Kensington	100	100	100	50
Charing Cross				
City Undertaking	100	100	77	37
West End Undertaking	100	100	100	100
Chelsea	100	100	100	100
City of London	100	100	100	81
County of London				
Kensington & Knightsbridge	100	100	67	69
London Electric Supply	100	100	100	100
Metropolitan				
Notting Hill	100	100	100	100
St. James & Pall Mall	100	100	100	100
South London				
South Metropolitan				
Westminster	100	100		91

Source: Annual financial statements of the companies.

in that year to its own account, Langhoff suggests that it would be more advantageous to the company to share the excess with consumers by reducing rates, thus making a larger bonus available to shareholders.

Some of the companies listed in Table XI have been able to effect a close adjustment between profits earned and profits payable; but in attempting to do this there is always the danger that earnings will fall so low as a result of reduced prices, that insufficient amounts will be available to pay the authorized bonus. Five companies in 1931 found that their forward balance had been wiped out; and in four of these cases there were insufficient funds to pay in full the authorized bonus. The percentage of the authorized bonus actually appropriated in the years 1928 to 1931 by the various London companies, is shown in Table XII.

It seems that the Chelsea Company has been most skillfully handled in this respect: it has been able to reduce the amount carried forward from 65.2% of the allowed amount in 1928,

to 17.4% in 1931. The City of London Company has managed to keep its forward account at a minimum; but its margin was so small in 1931 that it was able to pay only 81.5% of the allowed bonus that year, and only 70.3% in 1932.

Co-Partners' Benefit: The London Acts of 1925 permit the companies to adopt profit-sharing schemes for their employees, corresponding somewhat to the bonuses paid to stockholders. Nine of the sliding scale companies at the time of writing have adopted such plans. Co-partners (i. e. employees) may receive a bonus over and above their standard wages and salaries,[16] not to exceed one-sixth of the consumers' benefit. Details of a scheme must be approved by the electricity commissioners in each case. A co-partnership scheme is defined as one "of a profit-sharing character not necessarily including the ingredient of co-proprietorship as an essential item."

The commissioners have propounded four points which are to guide in the formulation of such plans:

1. In the event that available surplus profits are insufficient to cover the authorized bonuses, both shareholders and co-partners shall enjoy parallel participation in the surplus available.
2. The co-partners' share should be provided "on the basis of a uniform percentage addition to . . . normal salaries and wages."
3. The rate of benefit to co-partners should bear "some relation to the rate of additional dividend on ordinary capital under the sliding scale."

[16] Standard wages and salaries are fixed for the technical employees of the electrical industry by the National Joint Board of Employees and members of staff for the Electricity Supply Industry, in conjunction with the thirteen District Joint Boards. Salary schedules are revised periodically to compensate for changes in the cost of living.

4. The "schemes should provide reasonable facilities for the investment of the co-partners' benefit." That is, the employees should be permitted to invest in the company for which they work if they so choose.

When standard prices are revised the consumers' benefit is generally reduced to a negligible amount during the succeeding year or two. In order that this may not jeopardize the co-partners' bonus, the Act of 1925 prescribed that an appropriate addition to cover co-partners' benefit may be made in calculating standard prices, although another section provides that "such benefits shall remain a variable figure dependent upon the surplus profits of the undertaking and *shall not become a fixed addition* to the standard wages." Ten per cent of the allowance for wages and salaries was added to the total costs and charges used in computing the 1932 standard prices.

The first period of operation of co-partnership schemes terminated at the close of 1931. Prior to this date plans were submitted by the companies for new schemes, the first few of which when reviewed by the commissioners, revealed a diversity in essential provisions. Preferring to keep the various plans reasonably uniform and comparable, the commissioners added to their earlier recommendations, the following points:

1. The basic bonus should amount to 10% on salaries and wages (see below).
2. An additional bonus at the rate of 1-3/7% for each 1 per cent increase in dividends to ordinary shareholders above the standard 7% may be paid.
3. A reduction in the basic bonus of 1-3/7% should be made for every 1% by which the actual cost to consumers exceeds standard prices; i. e. when the Consumers' Benefit becomes a negative quantity.

These recommendations were incorporated in the seven revised schemes which were approved in March 1933. Clause one of these new plans provides that for each 1% which the divisible or retainable profits in any year represents on the paid-up ordinary share capital, a bonus of 1-3/7% on the total wages and salaries may be paid. In other words, a standard dividend of 7% automatically creates a basic bonus of 10%.[17] Additional bonuses are contingent upon surplus profits and the existence of consumers' benefit. The ratio of co-partners' to shareholders' bonus appears in Table XIII.

TABLE XIII

CO-PARTNERS' BONUS AS PERCENTAGE OF SHAREHOLDERS' BONUS

Name of Company	*1928* %	*1929* %	*1930* %	*1931* %
Brompton & Kensington		26.6	22.6	31.2
Charing Cross				
City Undertaking		14.6	24.6	46.3
West End Undertaking		21.0	46.9	20.9
Chelsea		32.3	30.8	
City of London	68.9	67.6	66.9	84.4
Kensington & Knightsbridge		38.7	38.0	30.6
London Electric Supply			12.1	13.0
Notting Hill	183.0	101.2	86.3	75.0
St. James & Pall Mall		22.4	21.0	20.4
Westminster		33.7	27.1	24.6

Note: The following London Companies have not adopted a Co-partnership plan—County of London, Metropolitan, South London, and South Metropolitan.

Source: Computed from the annual financial statements of the several companies.

Comparison with Non-Sliding Scale Companies: Surrounding the thirteen London (sliding scale) companies, there are twenty-seven extra-London companies which (except for certain power companies) are not subject to sliding-scale provisions. The conditions under which these two

[17] That is $.01^{3}/_{7} \times .07 \times 100 = 10\%$.

groups operate seem sufficiently similar to make a comparison valid. Such a collation appears in Table XIV where the charges of 1925 (the year before the London Acts of 1925 became effective) are given the value of 100. The data indicate that extra-London (non-sliding scale) companies have done better than the London sliding scale companies, as far as price reductions are concerned.

Comparison with Public Plants: Within the County of London and contiguous with areas served by the London companies, are districts served by Local Authorities. In

TABLE XIV

AVERAGE CHARGE PER UNIT

(*Company Undertakings*)

1925–1931

(IN PENCE 1925 = 100)

	1925	*1926*	*1927*	*1928*	*1929*	*1930*	*1931*
London Companies							
Lighting & Domestic	4.67 (100)	4.41 (92.6)	4.30 (90.4)	3.59 (75.5)	3.29 (69.1)	2.95 (62.0)	2.67 (56.1)
Extra-London Companies							
Lighting & Domestic	5.41 (100)	4.91 (90.8)	4.56 (84.3)	3.95 (73.0)	3.55 (65.6)	3.32 (61.4)	2.92 (54.0)

Source: *London and Home Counties Electricity District: Electricity Supply*, vols. i-vi.

1931 prices charged by the privately owned (sliding scale) companies for domestic and lighting service were 37.6% *above* charges made to the same class of customers by the public plants. Charges to power consumers were practically the same among both classes of undertaking.

Conclusion: The standard price-standard dividend arrangement has little in its favor because of administrative difficulties. Under present-day conditions where gas and electricity are employed in a variety of uses it is unfair and

impracticable to regulate dividends payable by establishing a relationship between the maximum price charged any consumer, and a standard price. The basic system avoids this difficulty but it is complex and unintelligible to most consumers.

The maximum price-maximum dividend scheme, on the other hand (according to which a company is permitted to pay not more than a specified rate on a designated class of stock if the price charged does not exceed a stated amount) is simple; and if modified to fit modern conditions by the provision of individual maximum prices for each type of consumption it would afford the rudiments of an equitable system of regulation.

CHAPTER IV

The Sliding Scale in Toronto

Since the year 1887 the Consumers' Gas Company of Toronto has been regulated by means of a modified form of the sliding scale. An index fund of $1,000,000, consisting of premiums received from the sale of stock, was established by the Act of 1887. Withdrawals from this account, known also as the reserve fund, may be made for the purpose of paying salaries to officers of the company, dividends at the rate of 10% per annum to stockholders, and allocations at statutory rates to the plant and buildings renewal fund, whenever income of the company is insufficient for these purposes. The fund must be brought back to the statutory amount ($1,000,000) as soon as earnings permit. When the fund falls below $1,000,000 the company is authorized to increase the price of gas.

On the other hand, the company is required to decrease the price of gas when the amount credited to a special surplus account increases beyond a statutory limit. All surplus profits remaining after appropriations have been made to the reserve fund, the plant and buildings renewal fund, and a ten-percent dividend on the common stock has been paid, are carried to the special surplus account. Whenever the surplus is equal to five cents per thousand cubic feet on the quantity of gas sold the preceding year, the price of gas must be reduced for the then current year at least five cents per thousand cubic feet, to all consumers.

The history of the index portion of the reserve fund is indicated in Table XV and that of the special surplus account

in Table XVI. It is to be noted that the index fund as of 1934 showed a deficit of $63,969, thus indicating that income in recent years has been insufficient to provide the payments mentioned above.[1] The special surplus account of course has been depleted, but the company, at the time of writing, does not contemplate an increase in the price of gas.

The Price of Gas in Toronto: In order to compare the price of gas in Toronto with that in the United States and Canada, the net retail price per thousand cubic feet for an assumed consumption of 3,000 cubic feet per customer per

TABLE XV

RESERVE FUND, 1887 TO 1934

Year	*Prem. on Cap. Stk. Act 1887*	*Profits*	*Deficits*	*Sundry*	*Balance Sep. 30*	*One-half Paid Up Cap. Stock Permissible Reserve*
1886					394,310	
1887	119,474	8,841			522,626	574,480
1888	40,864		37,962		525,528	600,000
1889	222,053		9,098		738,483	746,600
1890	5,003				743,486	750,000
1891	67,925			43,000	768,411	799,880
1892	164		19,883		748,691	800,000
1893			5,933		742,758	"
1894	82,867				825,625	850,000
1895			72,475		753,150	"
1896					"	"
1897					"	"
1898					"	"
1899					"	"
1900					"	"
1901	57,576		20,870		789,855	875,000
1902		10,802			800,657	"
1903	54,578		8,918		846,316	900,000
1904	191,113		86,127		951,302	999,300
1905	1,394	20,460			973,156	1,000,000
1906		26,844			1,000,000	"
1907					"	"
1908					"	"
1909					"	"

[1] However, there was a balance of about $7,000,000 in the reserve fund as a whole, and roughly $4,000,000 in the plant and buildings renewal fund at the end of the fiscal year 1933-34.

1910				"	"
1911				"	"
1912		56,114		943,886	"
1913		13,417		930,469	"
1914	2,536			933,005	"
1915		143,274	6,983	782,748	"
1916		97,792		684,956	"
1917				"	"
1918		279,100		405,856	"
1919		127,064		278,792	"
1920	129,709		97,604	506,105	"
1921	352,989			859,094	"
1922	140,906			1,000,000	"
1923				"	"
1924				"	"
1925				"	"
1926				"	"
1927				"	"
1928				"	"
1929				"	"
1930				"	"
1931				"	"
1932				"	"
1933		555,675		444,325	"
1934		508,294		63,969(d)	"

(d) = deficit.

month has been used.[2] Service and minimum charges, where these prevail, have been taken into account.

A direct comparison of prices in American cities with those in Toronto, is not entirely just because Canadian cities are burdened with a customs duty and excise tax on coal imported from the United States, amounting today to 43½c per net ton, plus a rail freight charge for the haul from the border to Toronto, amounting to a dollar per net ton.

Despite this disadvantage, the Consumers' Gas Company of Toronto sales gas at a price 16% below the arithmetic average price charged in twenty-nine of the principal reporting cities of the United States; and 23% below the

[2] There are two reasons for adopting this basis of measurement: only 1.7% of all customers of the Consumers' Gas Company consume 1 MCF or less per month, and those customers take only about 3.5% of all gas sold; in the second place figures on gas prices published in the U. S. Statistical Abstract are based on a monthly consumption of 3,000 cu. ft. per household customer.

TABLE XVI

SPECIAL SURPLUS ACCOUNT

Year	*Amount transferred to (withdrawn from)*	*Balance in S. S. account at Sep. 30*	*Value of gas sold @ 5c. per M*	*Reductions in Price of Gas*
1889	—	—	—	Oct. 1–From 1.25 to 1.12½
1893	—	—	—	Apr. 1–From 1.12½ to 1.05
1896	—	—	—	Jly. 1–From 1.05 to .90
1903	—	—	—	Jan. 1–From .90 to .80
1906	64,086	64,086	71,164	Oct. 24–From .80 to .75
1907	(8,618)	55,467	82,213	
1908	21,367	76,835	94,424	
1909	(54,904)	21,931	103,250	
1910	55,481	77,412	120,386	
1911	(48,708)	28,704	132,112	Jan. 1–From .75 to .70
1912	(28,704)	—	145,536	
1913–1921	—	—	—	Incr. 1917–21.70 to 1.25
1922	120,312	120,312	233,297	Decr. Feb. 5
1923	95,863	216,175	258,496	Decr. Jne. 14, 1922
1924	9,855	226,030	250,355	Decr. Apr. 11, 1924
1925	(22,323)	203,707	252,034	
1926	28,808	232,515	263,308	
1927	(143,352)	89,163	269,609	
1928	61,549	150,712	280,125	
1929	68,452	219,165	290,978	
1930	65,438	284,603	299,214	
1931	(57,788)	226,814	296,398	Decr. Apr. 1931
1932	(205,608)	21,206	301,640	
1933	(21,206)	—	282,852	

TABLE XVII

NET RETAIL PRICES OF MANUFACTURED GAS IN PRINCIPAL CITIES OF CANADA, PER 1,000 CUBIC FEET OF GAS BASED ON A CONSUMPTION OF 3,000 CUBIC FEET PER MONTH, AS OF AUGUST, 1934

	Price
Hamilton	$.75
Toronto	.97
Montreal	1.10
London, Ont.	1.17
Winnipeg	1.29
Vancouver	1.34
Ottawa	1.43
Quebec	1.50
Halifax	1.75
Average	1.26

TABLE XVIII

NET RETAIL PRICES OF MANUFACTURED GAS IN PRINCIPAL CITIES OF THE UNITED STATES, PER 1,000 CUBIC FEET OF GAS FOR HOUSEHOLD USE, BASED ON A FAMILY CONSUMPTION OF 3,000 CUBIC FEET PER MONTH, AS OF DECEMBER 15, 1932 *

	Price
Detroit	$.77
Omaha †	.79
Birmingham	.80
Milwaukee	.82
Baltimore	.85
Philadelphia	.88
St. Paul	.90
Washington	.93
Indianapolis	.95
Minneapolis	.96
Rochester	1.00
Providence	1.13
New Haven	1.13
Fall River	1.14
Boston	1.16
Portland, Oregon	1.17
Newark	1.21
New York	1.23
Cleveland	1.25
Norfolk	1.28
Richmond	1.29
St. Louis	1.30
Manchester	1.34
Scranton	1.40
Portland, Maine	1.42
Seattle	1.43
Savannah	1.45
Charleston, S. C.	1.45
Jacksonville	1.92
Average	$1.15

* U. S. Statistical Abstract 1933, p. 681.

† Municipal Plant.

average for nine leading cities in the Eastern half of Canada.[3] The Canadian figures are for all consumers; the American are for household consumption. (See tables XVII and XVIII).

[3] One city (Hamilton) has a lower price for gas than Toronto. In Hamilton the price of gas at the time of writing is 75c. per MCF for the first 16,000 CF. A competitive price of electricity would be 7 mills; the actual price is 1c. per kwh. Thus, Hamilton, without direct competition or a sliding scale has a lower price than Toronto. See *infra*.

Is the price of gas in Toronto low because of the sliding scale, or because of some other relevant factor, such as the price of electricity?

The average equivalent effective heat value in B. T. U. of 1000 cubic feet of gas for cooking and water heating, compared to that of 1 kilowatthour of electric energy is as 108.5 to 1.[4] Therefore if gas costs $1 per thousand cubic feet, the equivalent cost of electricity will be 1.00/108.5 or a little over 9 mills (9.22) per kwh.[5]

Both gas and electric rates usually decrease as the amount consumed increases; this necessitates our comparing the rates for those amounts of gas and electricity which are applicable to the volume consumed for cooking, water heating, refrigeration, and other competitive uses. Those prices, derived from rate forms used in Toronto, are 9 mills per kwh for electricity and 86c per thousand cubic feet for gas. Therefore electricity and gas are strictly speaking, not competitive and the low price of gas cannot be explained by the price of electricity;[6] other factors must be responsible, of which the sliding scale may be one.

Earnings of the Company: The 10% dividend on par value of stock issued and outstanding amounted to 5.2% on the aggregate capital invested when Whitten made his study in 1911. In 1934, it amounted to 5.46% on the total assets of $25,720,811. Or, if the total investment is taken to be the shareholders' contribution (capital plus premium) plus

[4] See Appendix. Gas and electricity are assumed to be competitive for the purposes of cooking, water heating, and refrigeration.

[5] This does not mean that the use of gas or electricity for cooking and water heating would be optional for most consumers, because of the initial cost of installing electrical equipment. In practice, therefore, the cost of electricity must be less than the equivalent in order to offset the first cost of electrical appliances.

[6] If electricity were competitive with gas in Toronto it would have to sell for .86/108.5 or 7.92 mills instead of 9 mills.

the balance of the reserve fund, excluding premium, plus the plant and buildings renewal fund,—a total of $24,817,031, the 10% dividend amounted to 5.66% on the investment in 1934.

This company has steered clear of holding company alignments during its eighty-six years, and throughout this period has maintained its original corporate identity. There have been no financial reorganizations, nor have any subsidiary companies been formed.

Conclusion: The Toronto type of sliding scale is unique and simple. Stripped of details it is an arrangement which authorizes the company to raise the price of gas when a reserve fund is reduced below a statutory amount; and requires it to reduce the price of gas when a special surplus account exceeds a stipulated sum. This arrangement avoids the rate base-rate of return problem, and allows freedom in the adoption of flexible rate forms.

CHAPTER V

The Sliding Scale in Boston [1]

I. HISTORICAL BACKGROUND

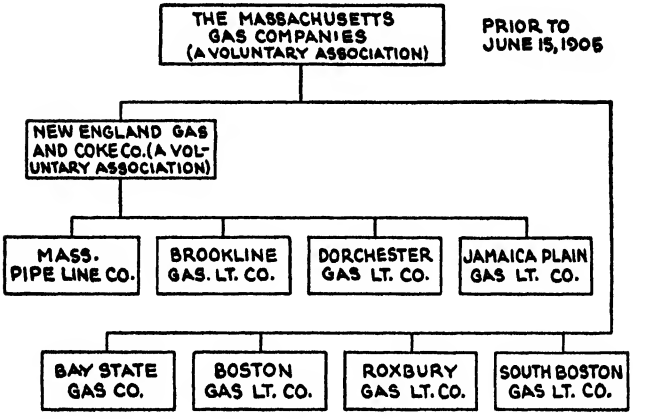
It is impossible to appraise Boston's experience with the sliding scale without an adequate historical perspective. In the year 1885 a Mr. J. Edward Addicks organized the Bay State Gas Company to serve Boston in direct competition with the companies then operating in that city; shortly thereafter he obtained control of the Boston, Roxbury, and South Boston companies as well. The stocks which gave Addicks control over these companies were then put up as collateral for $10,000,000 of bonds which were issued by his original company, the Bay State. Although the four absorbed companies maintained their corporate identities they no longer produced the gas they sold, purchasing it instead from the Bay State. Moreover they continued to charge prices which had prevailed before the Bay State took over the management.

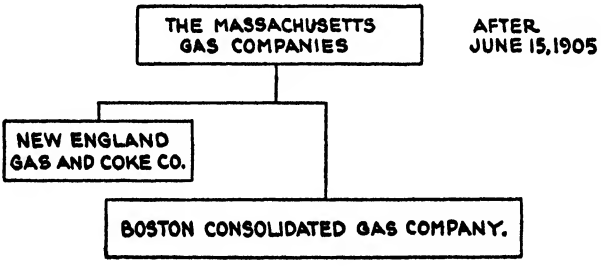
Meanwhile, the Standard Oil Company, which had begun to extend its influence into the manufactured gas industry, acquired control through Mr. H. H. Rogers of the Brookline (Massachusetts) Gas Light Company in 1893.

[1] In this resume I have depended almost entirely upon reports and documents of the Board of Gas and Electric Light Commissioners of the Commonwealth of Massachusetts, especially the Thirty-second Annual Report for the year 1916, Public Document no. 35 (Boston, 1917), pp. 448a *et seq.* Also Brandeis, Louis D., *Business — A Profession* (with preliminary remarks by Ernest Poole, Felix Frankfurter and James C. Bonbright), Hale, Cushman and Flint (Boston, 1927), pp. 99 *et seq.* Other sources are referred to in the text.

CHART A

INTERCORPORATE RELATIONSHIPS





The latter had been supplying gas to the residents of Brookline and Brighton exclusively; but Mr. Rogers proceeded at once to extend the company's mains into Roxbury and Boston and subsequently into Dorchester and South Boston, where he came into direct competition with the companies already established in those communities. In the

struggle for supremacy which followed, the Jamaica Plain, and Dorchester Gas Light Company fell under the control of Rogers; shortly after (in 1896) the Boston Gas Light Company contracted to purchase its gas from the Brookline Gas Light Company (Rogers' company), whereupon Rogers brought his competitive activities in the Boston area to a close.

In the same year a special charter was granted to a new undertaking, the Massachusetts Pipe Line Gas Company, which was promoted by Mr. Henry M. Whitney. The charter empowered the company to make and sell gas "without specification or restriction as to locality". It was given broad and unusual powers to construct mains and purchase or lease other plants. While it was probably intended to compete with other companies in the Boston field, especially in the sale of unpurified, unenriched fuel gas, it restricted its business to the sale of gas to other companies. It built a holder and purifier in Everett and connected its mains with those of the other companies.

As a part of this sweeping scheme, a voluntary association (unincorporated) known as The New England Gas and Coke Company was formed in 1897 to acquire control of the Pipe Line Company, the Brookline, Dorchester, and Jamaica Plain Companies (Rogers' companies),[2] the stocks of which were pledged as security for bonds issued by the New England Gas and Coke Company. The latter also built a by-product coke-oven plant in Everett, "adjoining and connecting with the Pipe Line Company's purifiers and holder", and contracted for the sale of gas to The Pipe Line Company which re-sold it to the other gas companies of Boston and vicinity.

It was not long, however, before the holding company (the New England Gas and Coke Company) was forced into the

[2] See Chart A.

hands of a receiver. In 1902 another voluntary association known as The Massachusetts Gas Companies, emerged and took over the securities of the insolvent association and the power of control that went with them. A year later it acquired "through foreclosure . . . a controlling interest in the Securities of the Bay State, Boston, Roxbury, and South Boston Gas Companies . . .", which provided it with virtual control over the eight gas companies in the Boston area.

2. ADOPTION OF THE SLIDING SCALE

During this struggle of private interests for control of these companies there was much popular disapproval and dissatisfaction. At length in 1905 the legislature passed an act authorizing the Bay State, Boston, Brookline, Dorchester, Jamaica Plain, Massachusetts Pipe Line, Roxbury, and South Boston Companies to combine as the Boston Consolidated Gas Company on terms which were acceptable to all. The Massachusetts Gas Companies (the holding company), however, continued to retain a controlling interest in the new Boston Consolidated, as it had previously controlled the separate companies.[8] It will be noted that the New England Gas and Coke Company was not included in the consolidation,—ostensibly because the latter (as well as the Massachusetts Gas Companies) does not deal directly with the public and is therefore alleged to lie beyond jurisdiction of the Department of Public Utilities. Had these companies

[8] In order to acquire the shares of the independent companies the Consolidated was authorized to issue 151,246 shares of $100 par. Of this amount 151,110.6 were taken by the trustees of the Massachusetts Gas Companies (the holding company). See Twenty-first Annual Report of the Board of Gas and Electric Light Commissioners of the Commonwealth of Massachusetts, for the calendar year 1905. (Boston, 1906), pp. 5-6.

been included they would have been subjected to direct regulation.[4]

After the combination of 1905 the Boston Consolidated Gas Company continued to purchase gas from the New England Gas and Coke Company. It is this arrangement which appears to have had an unwholesome influence upon the sliding scale, as we shall see in a moment.

When the consolidation was authorized the legislature directed the governor to appoint a committee "to consider the . . . London sliding scale with special reference to the expediency of applying that scale to the gas light companies in the City of Boston and the town of Brookline. . . ."

Although the majority of this committee did not take a definite stand, the minority recommended adoption of the sliding scale.

The Legislature followed this recommendation, Chapter 422 of the Acts of the Year 1906 (approved May 26) being entitled, "An Act to permit the reduction of the price of gas in the City of Boston and its vicinity". It provided

(1) That the standard price shall be 90c per one thousand cubic feet of gas;

(2) That the standard dividend should be 7% on the par value of the stock;

(3) That if during any year ending on the thirtieth day of June the maximum net price per thousand feet charged

[4] The legal status of an ancillary company (such as the New England Gas and Coke Company and the Massachusetts Gas Companies) which does not deal directly with the ultimate consumer, but which has a relatively close contractual relationship with a public utility company, has not been settled. The Massachusetts Department of Public Utilities at the time of writing (1935) is uncertain of its powers, but feels that it has authority to investigate *contracts* between the parent association and the Consolidated Gas Company and indeed is at present engaged in an investigation of the cost of gas sold by the Massachusetts Gas Companies to the Boston Consolidated Gas Company.

by the company has been less than the standard price, the company may during the following year declare and pay dividends exceeding the standard rate in the ratio of one-fifth of one per cent for every one cent of reduction of said maximum net price below the standard price.

(4) New stock to be issued must be authorized by the Board both as to amount and price, and must be offered for sale by the company at public auction, and no bid shall be accepted at a price below that fixed by the Board.

(5) The standard price shall remain in effect ten years, after which time the Board of Commissioners shall have the power to raise or lower it to such extent as may justly be required by reason of a change in the cost of production.[5]

TABLE XIX

BOSTON CONSOLIDATED GAS COMPANY DIVIDENDS PAID ON COMMON STOCK AND PRICES CHARGED FOR GAS *

1907–1926

Year	*Price*	*Dividends*
1907	$0.90	7%
1908	.85	8
1908–1913	.80	9
1914	.80	8
1915-1916	.80	8½
1917	.80	6½
1918	1.00	7
1919	1.00	7
March 5, 1920–July 22, 1920	1.10	7
July 23, 1920–Jan. 3, 1921	1.35	7
Jan. 4, 1921–June 14, 1921	1.40	7
June 15, 1921–May 31, 1922	1.35	7½
June 1, 1922–Jan. 31, 1923	1.30	8
1923	1.25	8
1924	1.20	8
1925	1.20	9
1926	1.20	8

* From private correspondence with the company.

[5] See 22nd Annual Report of Board of Gas and Electric Light Commissioners of Massachusetts (1906). Appendix C, p. clxxxvi.

3. THE FIRST TEN YEARS, 1906-1916

During the first ten years several attempts were made by consumers to obtain lower prices for gas; but the legislature refused to grant relief. In 1915 a number of bills were offered, one of which provided for revision of the standard price to 70c and the standard dividend to not more than 7%; but it was defeated. The Governor then recommended that the whole question be studied by the Board of Commissioners so that when the ten-year period expired in 1916 the legislature would be prepared to take definite action. The Board made its investigation and reported to the Legislature March 1, 1916. From that report most of the facts in this section have been taken.

The Commissioners found three major deficiencies in the existing arrangement:

(1) In 1905 the price charged the Consolidated Gas Company by the New England Gas and Coke Company was 23c per thousand cubic feet of unpurified gas of eighteen candle power; at the expiration of this contract in 1907 a new agreement was made at a price of 29½c, with a guarantee that the cost to the Consolidated Gas Company of purifying the gas so purchased should not exceed half a cent per thousand cubic feet. Throughout the ten-year period this price remained, despite the fact that consumption had greatly increased and the cost of production had declined, due to better utilization of plant capacity.[6] (Table XX).

Although the Consolidated was the first company in the state to reduce the price of gas to 80c, about one-third of those Massachusetts companies whose output exceeded 100,-

[6] The Board could not require The New England Gas and Coke Company to pass economies on to the Consolidated, for the latter's charter limited the Board to finding "that the price . . . paid for the gas purchased is less than it would cost said Boston Consolidated Gas Company to make its gas in gas works of standard type . . . "

000,000 cubic feet per year, and which were not on the sliding scale, likewise by 1915 had reduced their prices to 80c; while two companies in this class had reduced their prices voluntarily to 75c.[7]

(2) The companies producing and distributing gas were found to be allowing practically nothing for depreciation, and it was implied that money which should have gone for this purpose was being paid as dividends.[8]

(3) The Commissioners found

that the trading relations with the affiliated companies[9] of the Massachusetts Gas Companies forced upon the Boston Consolidated company by their common ownership, are inconsistent with the purpose and theory of the sliding scale as a scheme of regulation. If profits can reach the stockholders of a gas company under the sliding scale by any other means than through its dividends, the basis of control is impaired if not wholly destroyed. It is immaterial to the owners of the securities of the 'Association' whether the dividends which reach them come from the profits of the Gas Company or the Gas and

[7] These two were located in Lynn and Worcester respectively.

[8] These faulty accounting practices were made possible by the fact that the companies were allowed to run their business for the most part as they saw fit during this period, the Commissioners believing that the incentive to economy and efficiency which the sliding scale offered could be relied upon as an automatic regulatory device.

[9] The Massachusetts Gas Companies as of June 30, 1915 controlled directly or indirectly through stock ownership,

The New England Gas & Coke Co.
The Boston Consolidated Gas Co.
The East Boston Gas Co.
The Newton and Watertown Gas Light Co.
The Citizens Gas Light Company of Quincy.
The New England Coal and Coke Co.
The Boston Tow Boat Company.
The New England Manufacturing Co.
The Federal Coal and Coke Co.
The J. B. B. Coal Company.

Coke Company; but it is of vital importance to the consumer that, if his sole reliance for lower prices rests upon the incentives of the sliding scale, no profits on the gas which he consumes shall be distributed save through the dividends of the gas company . . . There is, in fact, reason to believe that under the conditions which have existed, the sliding scale has not had a fair trial, and in the light of the experience of these ten years there is no promise of any further reductions in price under it as long as the present relations with the other companies affiliated under the 'Association' are maintained. . . .

In view of these considerations the Board is of the opinion, and recommends, that the act shall be repealed unless the Boston Consolidated Gas Company is entirely dissociated from the Massachusetts Gas Companies, and its stock distributed directly among investors. If that is done a few years of further experience should develop conclusively the relative advantages or disadvantages of this system of public regulation.[10]

4. THE WAR YEARS AND THE SLIDING SCALE

No legislation followed this recommendation, however; and although the sliding scale continued in force, it is not mentioned again in Reports of the Gas and Electric Light Commissioners until 1918 when the company petitioned for an increase in the standard price of gas from 90c to $1.[11]

During the year 1918 the price was increased from 80c to 90c and then to $1 per M. cubic feet. But as a price of $1 authorized a dividend of only 5% the company (following in the footsteps of its British contemporaries) appealed to the Commission for authority to maintain the standard rate of dividend, despite the increased price of gas, basing its plea upon section 9 of the sliding scale act which reads as follows:

[10] Thirty-second Annual Report, pp. 475a *et seq.* See full reference at beginning of chapter.

[11] The company was selling gas in the year 1917 at 80c. per thousand cubic feet and had been doing so since 1908, which entitled it to pay a dividend of 9%; as a matter of fact, however, lower rates were being paid. See Table XIX.

At any time after the expiration of ten years from the thirtieth day of June, 1906, the board . . . shall have authority . . . to lower or raise the standard price . . . to such extent as may justly be required by reason of greater or less burdens which may be imposed upon the company . . . by reason of changes in the prices of materials and labor. . . .

" It is to be noted," said the company, " that no provision was made for any change in the standard rate of dividend, and therefore the inference seems irresistible that the Legislature deemed 7% a fair return for the company upon its capital stock." A majority of the Board of Commissioners concurred in this view and granted the petition.

On March 5, 1920, the Board permitted an increase of 10c, making the standard price $1.10, but at the same time it ordered an investigation of the company's affairs. This inquiry was conducted by the City officials of Boston. On July 23 of the same year, the Board allowed an increase of 25c, thus bringing the price to $1.35. A few months later the company appealed for an increase to $1.50, but the Board delayed action until the city officials completed their investigation.

The city's report supported the company's demands, although the commissioners felt that the time was not yet ripe to establish a standard price other than temporarily.

The city's findings, moreover, completely reversed those of the earlier committee with respect to the part played by the holding company. In brief, the 1920 report held that through its affiliation with the Massachusetts Gas Companies Association, the Consolidated obtained coal, oil, and gas more cheaply than it would have been able to do otherwise.[12]

[12] Ann'l Report, Dept. of P. U., part i, pp. 58-64 (Boston, 1922). It is quite probable that certain contracts which had been made between the holding company and the Consolidated during periods of lower prices redounded to the advantage of the Boston Consolidated Gas Co. during

5. BOSTON ABANDONS THE SLIDING SCALE

The scheme came to an end in the year 1926. A so-called Special Commission on the Necessaries of Life, appointed by the Legislature of Massachusetts in 1925 to investigate the cost of living considered among other items the cost of coal and the likelihood that the state may "be obliged eventually to make the retail distribution of fuel a public utility." But, the report continued,

> . . . Before taking drastic action, this Commission believes it would be better to determine if any considerable part of our household heating can be done by gas. If it is practicable to use gas for home heating it will stabilize the price of all domestic fuels, as there will be a competitor in the field whose price is controlled by governmental authority, ready to take advantage of any great increase in the price of other fuels.
>
> . . . The Metropolitan Boston District, due to its dense population, offers the greatest possibilities of any section of the State for developing gas as a domestic fuel. The Boston company recognizes the opportunities offered to engage in this business, but claims that it cannot do so, due to the peculiarities of the . . . Sliding Scale Act [which] was passed when a large amount of the production of this company was sold for illuminating purposes. Conditions in regard to the use of gas have entirely changed since that time. This Commission believes it would be in the public interest to have the Boston gas com-

the post-war years. Moreover, the uncertainty of an adequate supply of coal was considerably alleviated by the fact that the holding company controlled both transportation and coal companies. But the operating company's "gains" in this respect were the holding company's losses, and it would be irrational to expect a condition of this sort to continue; holding companies are not formed for the purpose of sacrificing themselves in behalf of their operating subsidiaries. Therefore we may safely assume that the holding company would replace losing contracts with profitable ones as soon as possible; and this is tantamount to saying that the pre-war relationship referred to and criticized in the 1916 report would be restored as soon as an opportunity afforded itself.

panies enter the field of home heating. This Commission has been unable to draw modifications of chapter 422, Acts of 1906, which would accomplish the purpose desired. After discussing this matter with the Department of Public Utilities, the Commission recommends:

That the Boston Consolidated Gas Company be taken out from under the provisions of the special act which it now enjoys and be placed under the control of the Department of Public Utilities, subject to the laws applying to all other gas companies in the Commonwealth, unless it is possible to make modification of the present law to permit the development of gas for heating purposes.[13]

As a consequence the Sliding Act was repealed in 1926.[14]

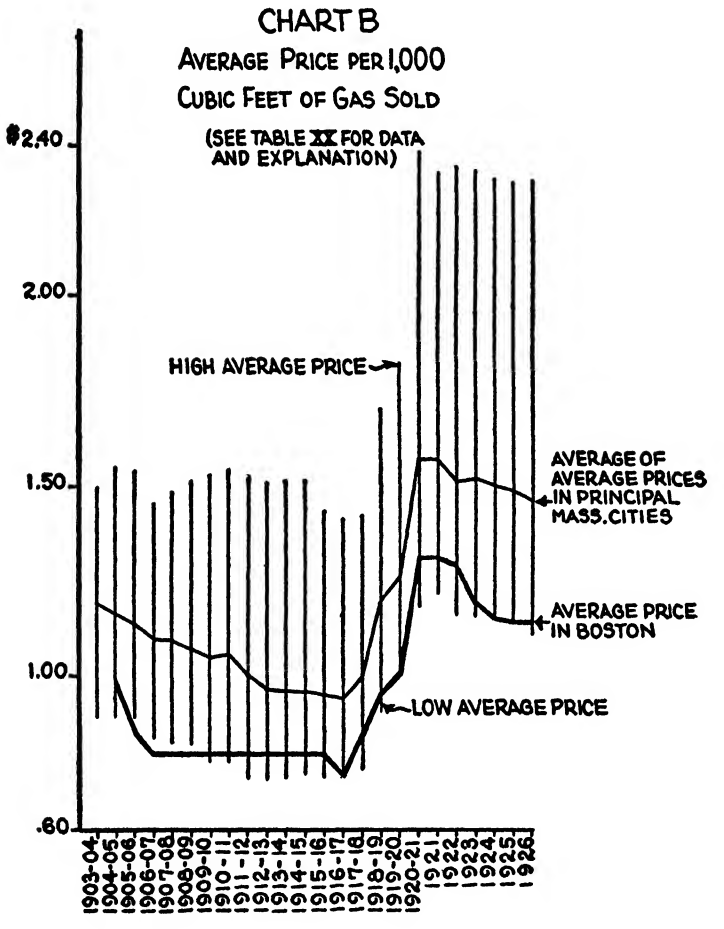
6. PRICES

The price of gas in Boston as compared with that elsewhere in Massachusetts[15] during the period of the sliding scale (1906 to 1926) indicates (See Chart B) that the average price of gas sold by the Boston Consolidated Gas Co. was considerably below the average of the average prices charged by other Massachusetts companies. Whether this

[13] Report of the Special Commission on the Necessaries of Life (Boston, 1926), pp. 88-89. Commonwealth of Mass., House Document no. 1250. The basic system might have been substituted, but apparently the Massachusetts Commission did not consider it.

[14] Commonwealth of Massachusetts. Special Report of the Department of Public Utilities Relative to Service Charges. Jan. 5, 1934, pp. 5-6. The repealing act is Chapter 186, Acts of 1926.

[15] Figures are limited to the state of Massachusetts for reasons of homogeneity and comparability. The curves in Chart B were derived as follows: The average price of gas for each reporting city was tabulated for each year from 1903 to 1926. Then an average of the average prices of gas in all reporting cities was taken for each year. Thus we have the high average price and the low average price among the reporting cities for each year, and the yearly average of the averages plotted as a curve. With this curve is compared the average price of gas in Boston during each year of the period, plotted also as a curve.



differential in favor of the Boston company is attributable to the modicum of incentive that the holding company allowed to remain in the plan, or whether it is to be explained by the fact that the Consolidated, which has a greater output than the other companies, was better able to realize the advantages of larger scale production, it is impossible to say from an analysis of the available data.

TABLE XX

AVERAGE PRICES PER M CUBIC FEET OF GAS SOLD

Year	In Principal Massachusetts Cities * High Average	Low Average	Average of Averages	In Boston Average
1903–04	$1.50	$.90	$1.19	$ †
1904–05	1.55	.90	1.17	.99
1905–06	1.53	.89	1.14	.86
1906–07	1.46	.84	1.10	.80
1907–08	1.48	.83	1.09	.80
1908–09	1.52	.83	1.07	.80
1909–10	1.53	.78	1.05	.80
1910–11	1.50	.78	1.06	.80
1911–12	1.52	.73	1.00	.80
1912–13	1.52	.73	.97	.80
1913–14	1.51	.74	.96	.80
1914–15	1.52	.75	.96	.80
1915–16	1.44	.74	.95	.79
1916–17	1.42	.74	.94	.74
1917–18	1.43	.76	.99	.84
1918–19	1.71	.92	1.19	.95
1919–20	1.82	1.01	1.26	1.01
1920–21	2.37	1.18	1.57	1.32
7–1 to 12–31				
1921	2.33	1.22	1.57	1.32
1922	2.35	1.17	1.51	1.29
1923	2.31	1.16	1.52	1.19
1924	2.32	1.16	1.50	1.15
1925	2.29	1.15	1.48	1.14
1926	2.30	1.12	1.46	1.14

* Excluding Boston.

† Not Reported.

Note: The low averages and high averages are computed as follows: due to the existence of block rate forms, it is necessary to compute the *average* price of gas in each city. The cities were then arranged in order, from lowest to highest. The low average price, therefore, is that of the city having the lowest average price of gas for the year; likewise, the high average.

Source: Annual Reports of the Department of Public Utilities of the Commonwealth of Massachusetts.

7. CONCLUSION

Boston's experience demonstrates the manner in which a holding company's dealings with its operating subsidiary may subvert the underlying purpose of the sliding scale. If

TABLE XXI

AVERAGE NET PRICE OF MANUFACTURED GAS FOR THE FIRST 1000 CUBIC FEET, FOR HOUSEHOLD USE IN PRINCIPAL CITIES OF THE U. S.*

1913–1926

	Price	*Relative*
1906		
1907		
1908		
1909		
1910		
1911		
1912		
1913	$0.95	100
1914	.94	99
1915	.93	98
1916	.92	97
1917	.91	96
1918	.95	100
1919	1.04	110
1920	1.09	115
1921	1.32	139
1922	1.29	136
1923	1.25	132
1924	1.24	131
1925	1.23	130
1926	1.22	128

* U. S. Statistical Abstract 1926, p. 730.

a reduction of prices is linked to an increase in dividends, it is highly important that the amount available for dividends be maximized. A process which permits insiders to divert potential net earnings into their own pockets, under the guise of operating expenses, directs the company's attention away from earnings of the operating company and thus interferes with or renders unnecessary a reduction of prices to the public. By means of such practices as those here revealed insiders are able to reap where they have not sown, and arrogate profits to themselves which the law intended they should receive only in return for reducing operating expenses and lowering prices to consumers.[17]

[17] From another point of view, however, a holding company relationship, honestly conceived and maintained, is not without advantages; for in general a system of rewards for good service will function most effi-

The Boston experiment indicates again the impracticability of attempting to maintain a standard price for an appreciable period, say ten years. Experience indicates that much of the friction and maladjustment which occurs in the general price structure emanates from the differential fluidity of change in groups or categories of prices. Statutory prices fluctuate least readily while those of basic raw materials tend to oscillate most freely. These differential changes give rise to stresses and strains, and retard the more or less uniform adjustment of groups of prices to fluctuating economic conditions. The standard price, therefore, represents simply another undesirable attempt to crystallize a variable in a world of movement.

ciently if those who receive the rewards and suffer the penalties, are in a position to transmute their psychological reaction to such a scheme, into direct managerial responses. A widely scattered, relatively inarticulate body of small stockholders cannot, or does not, do this. But a holding company (or a small, coherent body of relatively large stockholders) can, and probably will attempt to raise operating standards if there is a reward for doing so. Therefore in considering the holding company's function under a system of pecuniary rewards and penalties, these two potential and diverging types of reaction must be appreciated.

CHAPTER VI

The Dallas Plan

Since 1917 the Dallas (Texas) Power and Light Company has operated nominally under a municipal[1] franchise whose essential aspects, from the viewpoint of our present interest in the sliding scale, are as follows:

The value of property used and useful was determined, on which the company at the outset (in 1917) was permitted to earn 7%. The maximum price charged residential consumers at that time was 8c per kilowatthour. For each of the first four half-cent reductions in the maximum price of energy the company's allowable return was subject to an increase of one-half of one per cent. Further reductions of half a cent each in the maximum price authorize an increase of one quarter of one per cent in the return for each such reduction.

The company, moreover, is required to accumulate the following reserves: (a) a surplus reserve of not less than 12% of the property value; (b) an accident reserve of not less than 2½% of the gross receipts during the preceding twelve months; (c) a maintenance and depreciation reserve of not less than 6% of the property value.

The purposes of these reserves are as follows: The accident reserve is intended to equalize variations in operating expense that would otherwise result from losses due to personal injury, property damage, or other similar casualties.

The maintenance and depreciation reserve is to compensate for the losses sustained through wear, tear, and obsolescence.

[1] There is no state Public Utilities Commission in Texas.

The surplus fund is an equalizing account whose purpose is to (a) carry temporary burdens resulting from fluctuations in earnings; (b) prevent frequent or violent fluctuations in rates; (c) provide for payment of the return on property used and useful; (d) carry temporary burdens of unprofitable extensions; and (e) build the other reserves to normal. The surplus reserve is normal at 8% of the property value, and at a maximum when at 12%.

The value of properties used and useful was fixed at $4,958,982 as of October 1, 1917, when the profit-sharing franchise went into effect. Any approved additions to the property, financed with funds received through the sale of the company's bonds or stock, may be added to this figure at cost. Approved additions or betterments to property financed through the use of funds drawn from any or all of the three reserve accounts, however, may not be added to the property value. This provision is apparently based upon the theory that surplus earnings belong to consumers; therefore the company is not entitled to a return arising from the use of such funds. If improvements financed out of reserves are later funded by the issue of securities, the reserve accounts are to be reimbursed, and the company is thereafter permitted to earn the established return on the new property.

The company is authorized to dispose of its gross earnings in three ways: (a) in payment of operating expenses; (b) in payment of the allowable rate of return; and (c) in maintaining the three reserves.

Whenever the accident reserve and the maintenance and depreciation reserve are at their normal amounts, and the surplus reserve exceeds 50% of normal (i. e. in excess of 12% of the property value) the company is required to reduce the maximum price per kilowatthour by half a cent; if within six months thereafter the surplus reserve exceeds the normal amount by 30% the company is under obligation

to make further reductions of half a cent per kilowatthour in its maximum rate at intervals of six months until the surplus reserve is restored to its normal level.

Price Reductions: from October 1, 1917 to January 1, 1919 the maximum price charged by the company was 7c per kilowatthour, which permitted an 8% return. From 1919 to 1931 inclusive the maximum price was 6c and the rate of return 9%. Early in the year 1932 there was a general feeling among officials of the city that the maximum price should be reduced, although a decrease was not indicated under the franchise inasmuch as 12% of the property value as of January 31, 1932 amounted to $2,794,200, whereas the reserve stood at $2,680,650, or $113,550 less than the amount necessary to effectuate an automatic reduction.[2] Nevertheless, the reserve was $817,850 in excess of normal, and in view of the growing severity of the depression the city wished to use all or a portion of this excess in reducing prices immediately instead of waiting until the statutory limit of the reserve fund was reached.

In the end an adjustment was made along lines which virtually nullifies the sliding scale arrangement. The maximum price was reduced from 6c to 5.75c, but no addition to the current rate of return (9%) was sanctioned. To compensate the company for its willingness to forego an increase in the rate of return it was authorized to establish for a period of two years a new account known as the "Deferred Maintenance and Replacement Requisition," to which excess earnings hitherto allocable to the surplus reserve may be credited. At the end of the two-year period (August, 1934) the arrangement was extended at which time the maximum price was again reduced, from 5.75c to 5.5c. Thus the sliding scale feature of the plan has been waived

[2] By August, 1932, this difference had been reduced from $113,550 to $107,131.

for the time being inasmuch as the return and prices are not automatically and inversely adjusted.

Among the sixteen Texas cities of 25,000 population and over, only two had lower typical net monthly bills than Dallas for 25 kwh (residential service), one was on a par with Dallas, while twelve had higher bills as of January 1, 1935.

For 100 kwh three communities had lower typical monthly bills and twelve were higher. For 250 kwh monthly, seven were lower, one was on a par with Dallas while seven were higher. These figures point to the fact that the sliding scale in Dallas has been accompanied by slightly lower than average rates.

During the period 1918 to 1931 inclusive the company paid dividends ranging from 7.9% to 16.6% on the par value of common stock outstanding.

Several explanations of the apparent failure of the Dallas Plan suggest themselves. A return of 9% to a monopoly is relatively large, and offers management little incentive to increase its efficiency. Public opinion, moreover, is not likely to sanction a larger return over a sustained period, even though a franchise may authorize it. Under these circumstances a company receiving 9% may feel more secure in keeping prices up than by embarking upon an uncertain policy of lowering prices and earning thereby a right to higher returns which the public may criticize. Furthermore, a scheme of this kind requires close scrutiny by the controlling commission, of investments (especially the property value) and operating expenses. There are indications that the city of Dallas has failed to provide this sort of supervision.[3]

[3] Factual material relating to the Dallas method of control has been obtained from Mr. Joe L. Benson, a citizen of Dallas, and at the time of writing a member of the staff of the Federal Power Commission. Additional data have been taken from Senate Document 92, Part 69, 70th Congress, 1st Session (1934), being a report of the Federal Trade Commission. See especially Exhibit no. 6080, pp. 191-218—a report on the Dallas Power and Light Co., prepared by Mr. Carl H. Depue, for the F. T. C.

CHAPTER VII

The Sliding Scale in Connersville, Memphis, Philadelphia, Houston and Detroit

I. CONNERSVILLE (INDIANA)

As of October 29, 1917, the Indiana Public Service Commission applied the sliding scale in regulating the Hydro-Electric Light and Power Company of Connersville. For every 10% reduction in rates, taken as a whole, "the company was permitted an increase of .5% in the standard rate of return (6½%) on the rate base." The standard price of power sold for lighting purposes remained at 10c per kwh for the first 20 kwh.

The act, provided also

> that all securities of the . . . company hereafter authorized by the commission to be issued, shall first . . . be submitted to the public at public auction and sold at the best price obtainable therefor, delivery on bid, however, being conditional on the approval by the . . . commission . . . of the price offered; and any premium offered and paid for such securities shall go into the non-operating revenues of said company.[1]

On June 4, 1919, after a trial period of approximately eighteen months the commission reduced the rates approximately 10% and thus authorized a 7% rate of return. At the same time the terms of the sliding scale were revised so that in the future a variation of only 8% in prices would be sufficient to authorize a change of .5% in the allowed rate of return.

[1] See P. U. R. 1918 A, 325 *et seq.*

At the end of this first period, the company had a balance of approximately $10,000 after allowing for a return of 6.5% on the rate base. This balance was then transferred to a newly created Excess Earnings Fund which was to augment the company's income whenever it fell below the authorized rate of return. The commission in 1919, moreover, said that "so far it [the sliding scale] appears to be an unqualified success." [2]

A year later, however, the picture was quite different. By that time the full impact of the upward surge of prices fell upon the company. Coal alone had increased from $4.75 per ton in 1917 to $7.82 per ton. Operating costs as a whole nearly doubled. In the face of such unstable conditions the scheme was abandoned, the commission adding, however, that "in normal times the sliding scale would undoubtedly be conducive to economies of operation."

2. MEMPHIS

The arrangement by which the Tennessee Railroad and Public Utilities Commission regulated the Memphis Gas and Electric Company for several years after July 1, 1924 has sometimes been referred to as a sliding scale.

The company was permitted to earn 8% on the rate base, plus an additional amount

under certain conditions when the rates charged consumers were reduced. Conversely, when rates charged consumers were increased the rate of return would be decreased under the same conditions. . . . Excess earnings above the allowable return were held as a contingency fund to be used for the payment of the authorized return to the extent that . . . earnings during any period may be insufficient to pay . . . the authorized return . . . or for such other purpose as the commission may direct.

[2] Report P. S. C. of Indiana for fiscal year ending September 30, 1919, p. 18.

The novelty of this plan lies in its provision of a contingency fund for the stabilization of dividends and payment of those authorized but not earned. It otherwise is analogous to the British standard price-standard dividend scheme, and is subject to the same disadvantage of inflexibility as to rate forms. It is deficient, moreover, in failing to provide for definite supervision of the rate base.

After several years the experiment was abandoned under circumstances which the commission and the Electric Bond and Share Company (which controls the Memphis Gas and Electric Company) fail to disclose.[3]

3. PHILADELPHIA

The Philadelphia Gas Works are owned by the city but operated by the United Gas Improvement Company under a contract which contains a sliding scale clause.

The retail price of gas must be adequate to

(1) Pay all expenses (as defined) of the gas company incident to manufacture and sale of gas (less returns from by-products and wholesale gas);

(2) Yield an annual cash rental or return of $4,200,000 to the city during continuation of the lease (which constitutes a 7% return on the gas works whose value has been placed at approximately $60,000,000);

(3) Yield the operating company a return consisting of

(a) $600,000 annually, plus

(b) a further annual payment not to exceed $500,000 based on the efficiency with which the works are managed, as reflected in the cost of gas and growth of the business.

[3] See Report of the Tennessee Railroad and Public Utilities Commission for the period Dec. 1, 1922 to November 30, 1924, pp. 110-111.

When the present agreement went into effect (1928) the price of gas was one dollar per thousand cubic feet for amounts up to 50,000 cubic feet per month delivered to one customer. This price is used, therefore, in the formula to determine the company's reward for efficiency. This extra compensation bears the same relation in cents per thousand cubic feet of gas sold at retail to one cent, as one dollar bears to the price in such year of retail gas per thousand cubic feet, such extra payment varying directly with the quantity of gas sold and inversely with the price, provided that the extra payment shall in no year be less than $200,000 or more than $500,000.

To illustrate: during the fiscal year ending August 31, 1934 the amount of gas sold at retail was 8,250,809 MCF, and the price 90c. In the formula

$$x : 1c :: \$1 : 90c,$$

x equals 1.11c per thousand cubic feet, which on 8,250,809 MCF amounts to $91,583. This amount, plus $600,000 is less than the minimum compensation of $800,000; therefore the latter sum was paid.[4]

The price of gas on a volumetric and on a thermal basis in comparison with like figures for nineteen other representative American cities is presented in Table XXVI. Philadelphia ranks sixth and seventh according to the respective methods of tabulation.

[4] Recently the definition of retail gas was changed to include only the amount of 2,000 cubic feet or less sold in any one month to any one customer. Thus, in order for the company to receive more than $800,000 in any one year it would have to sell at a retail price of 90c., 118% more gas at retail than it sold in the fiscal year 1933-'34 at that price; or else it would have to sell the 1933-'34 amount at about 40c. per MCF instead of 90c. Neither of these eventualities is likely to supervene, and therefore it is improbable that the Philadelphia sliding scale, in its present form, will materially influence Philadelphia gas prices.

The Philadelphia plan is not adapted to present-day requirements inasmuch as it does not permit the company to introduce flexible price schedules.

4. HOUSTON (TEXAS)

From 1915 to 1934 the Houston Lighting and Power Company operated under an agreement with the city which permitted the company to earn 8% on its "capital investment" plus 4% for depreciation. Additional earnings, if any, were divided equally between the company and the community served. The city of Houston received the following amounts under the arrangement:

Year	*Amount*
1923	$ 95,677
1924	10,905
1925	——
1926	73,460
1927	101,200
1928	115,379
1929	106,816
1930	112,629
Additional 1925–1930 Inc.	46,113 [5]
1931–1934 Inc.	Nil

In the year 1934 the agreement was modified by an amendment which requires the company to pay the city $25,000 annually whether 12% is earned on the so-called capital investment or not.[6]

5. DETROIT

As this study goes to press a profit-sharing plan embracing sliding-scale principles is being proposed for ratification

[5] Represents amount collected from the company after an audit of the company's books by city officials.

[6] Although the scheme contains the rudiments of a sliding scale, it is a loose form of regulation. Aside from the fact that the rate of return is excessive, there is inadequate supervision over the "capital investment" (rate base).

The information has been taken from a report by Mr. Everett Eslick, Regional Supervisor in the Electric Rate Survey, Federal Power Commission.

by the court in Detroit. Following an unsuccessful effort (from April to October, 1935) to prevent the Detroit City Gas Company from instituting a rate increase, the city council decided to submit the issue to Detroit voters in the form of a proposal to establish a competing municipal gas plant. When this threat was made, however, the company announced its willingness to adopt a profit-sharing arrangement based on a sliding scale if the city would withdraw its proposal to establish a municipal plant. The city agreed; whereupon the following plan was adopted (at the time of writing, however—November 1935, it has not been formally ratified by the court):

(1) A property valuation of $55,000,000 was established, (although the company's books showed property plus working capital amounting to $68,700,000).

(2) A "base return" of 7% or $3,850,000 per year was allowed on the property account.

(3) Net revenue in excess of this base return is to be divided between the company and consumers as follows: of the first $550,000 above the base return, 50% shall go to the company and 50% to consumers; 75% of all further profits shall be distributed to consumers and 25% to the company. The consumer's share of these excess earnings will be based in any specific case upon the amount of his consumption; it will be paid to him once a year in the form of a cash dividend.[7]

[7] The information available makes no mention of substandard returns on the property valuation.

CHAPTER VIII

The Sliding Scale in Washington D. C., or the Washington Plan

TABLE XXII

Potomac Electric Power Company Chronology

1881	Heisler Electric Company formed.
October 1, 1882	United States Electric Lighting Company formed. Purchased the Heisler Electric Company.
April 18, 1891	Potomac Electric Company formed. Failed July 17, 1893.
November 3, 1894	Potomac Light and Power Company incorporated under laws of the District of Columbia formed.
January 20, 1896	Potomac Light and Power Company of Virginia formed.
April 28, 1896	Potomac Electric Power Company formed. In June 1896 it purchased the Patomac Light and Power Company incorporated in the District of Columbia, and that incorporated in Virginia.
March 3, 1899	Congress placed its only limitation on rates—10c. per kwh.
September 30, 1902	The Potomac Electric Power Company purchased the United States Electric Lighting Company and thus became the only electric company in the District of Columbia.
March 3, 1913	Public Utilities Commission of the District of Columbia created by Act of Congress.
June 1, 1914	Commission began work of valuation.
May 18, 1916	Commission transmitted report of its findings to P. E. P. Co.

June 26, 1916
to
January 31, 1917 ..... Hearings on valuation begun. Continued at intervals until January 31, 1917. Commission fixed the valuation at $11,231,170 as of December 31, 1916. Company brought suit in the District of Columbia Supreme Court.

June and July, 1917 ..... Hearings on rate of return and prices to be charged. Commission enjoined from changing prices while valuation case was pending. Impounded fund established.

March 2, 1920 ..... Justice Gould of District of Columbia Supreme Court upheld Commission on valuation. Company appealed to District of Columbia Court of Appeals.

June 10, 1920 ..... Congress appropriated $25,000 for a survey by Federal Power Commission, of water power possibilities at Great Falls on the Potomac.

December 31, 1920 ..... Tyler report recommending utilization of Great Falls water power.

June 8, 1921 ..... Senate passed amendment appropriating $200,000 for the Great Falls development, but the amendment was deleted by Senate Conference Committee.

November 7, 1921 ..... Decision in favor of the company.

April 9, 1923 ..... Decision of U. S. Supreme Court.

April 10, 1924 ..... Senate passed Norris bill again proposing Great Falls development, but the House of Representatives offered a substitute bill. Not passed.

December 31, 1924 ..... Consent Decree.

Year 1930 ..... Investigation of company's accounts by the commission.

December, 1930 ..... Commission finds return excessive.

May 25, 26, 27, 1931 ..... Hearings as to return on rate base.

June 8, 1931 ..... Order 919.

September, 1931 ..... Case before Court as to the Decree. Company submitted Bill in Equity (Bill of Complaint) setting out grievances.

November 16, 1931 ..... Chief Justice Wheat's memorandum.

December 15, 1931 ..... Answer to Bill of Complaint by Commission and Peoples' Counsel jointly. Followed by a hearing before Court on record before the commission. Argument followed by briefs filed by the company and the Peoples' Counsel.

July 27, 1932 ..... Justice Luhring of the District of Columbia Supreme Court found that the P. U. C. had jurisdiction to issue Order 919 and to alter or amend the existing sliding scale arrangement.

July 29, 1932 ..... Court embodied its findings of July 27, 1932 in a Decree. Company appealed from the Decree and perfected its appeal whereupon the case went to the District of Columbia Court of Appeals.

February 8, 1933 ..... Company and Commission settled their differences by negotiation and incorporated the terms of the Agreement in a new decree dated February 8, 1933, retroactive to January 1, 1933.

Latter part of 1934 and early 1935 ..... Commission went over books of the company to determine if retirements had actually been subtracted from the rate base.

January 7, 1935 ..... Commission gave notice of a hearing to be held January 28 for purpose of "considering rates, tolls, and charges ... and pertinent ... data."

January 30, 1935 ..... Order No. 1316 (Formal Case No. 254) reducing slightly the rates for domestic lighting and certain commercial retail consumers.

I. EARLY HISTORY OF THE POTOMAC ELECTRIC POWER COMPANY 1881-1914

THE company as we know it today, is the outgrowth of organizing activities which were carried on by professional promoters in the early days of electrical development. Well versed in financial legerdemain and the processes by which that legal entity, the corporation, may be manipulated and rendered subservient to the private ends of those who call it

into being, these men created, dissolved, bought, sold and bartered during a period of twenty years, the corporate antecedents of the present company.

The record of these early activities is incomplete, incoherent, and in some respects, probably inaccurate; for no attempt was made to arrange in orderly fashion even what fragmentary historical data we have, until the year 1914,—thirty-three years after the original ancestor of the present company was formed.

If we are willing to overlook these shortcomings in the record, however, we may trace in a reasonably illuminating manner, the lineal descent of the Potomac Electric Power Company.

The first attempt to introduce electric lighting into the city of Washington, took place in the fall of 1881 at ceremonies held in dedicating the Scott statue at Sixteenth Street and Massachusetts Avenue N. W.

Although this attempt was not a success, the Heisler Electric Light Company was formed soon thereafter (1881). Whether this company was incorporated or not is unknown; at all events, it was not incorporated in the district of Columbia.

On October 1, 1882 the United States Electric Lighting Company was organized under the laws of West Virginia, to do business in the District of Columbia. Its capitalization consisted of $100,000 of stock (whether all common, or part common and part preferred is not indicated by the commission's records).

On December 9, 1882 it purchased all of the property rights and franchises of the Heisler Electric Light Company, paying its entire capital stock, $100,000. Thus, the Heisler Company went out of existence, leaving the U. S. Electric Lighting Company for the time being in control of all elec-

tric business done in the city of Washington (east of Rock Creek).

A little more than eight years after the United States Company had established itself, however, a new and independent corporation, The Potomac Electric Company, was incorporated under the laws of the District of Columbia April 18, 1891, its capital stock amounting to $25,000; but after about two years it failed. A receiver was appointed July 17, 1893, and the property was sold on October 11, 1894 to one Amherst H. Wilder of St. Paul, Minnesota (the sole stockholder, and an owner of some of the company's bonds) for $50,000.

Wilder and others then formed the Potomac Light and Power Company under the laws of the District of Columbia on November 3, 1894. Capital stock authorized amounted to $35,000.

A year or so later (January 20, 1896) a new personage, Oscar T. Crosby (who from that time played a prominent role as promoter) formed a group which incorporated under the laws of Virginia, the Potomac Light and Power Company. This company, it will be noted, bears the same title as the one referred to in the preceding paragraph, the only significant difference apparently being that the former was incorporated in the District of Columbia. Capital stock of the Virginia company was to be "not less than $100,000, with the right and power to increase it to not more than $500,000". Crosby and Charles A. Lieb then transferred certain electrical property and franchises controlled by them to the latter company in February, 1896, receiving in return 2,987 shares of capital stock. It appears that only 3,000 shares were issued all told at this time, so that Crosby and Lieb had indisputable control.

A few months after this transaction, Crosby and Lieb in collaboration with Frederick C. Stevens, formed on April

28, 1896 (Acts of Incorporation, Vol. 7, p. 268) under the laws of the District of Columbia, the company which is the subject of our study,—the Potomac Electric Power Company, " to manufacture, buy, sell, and distribute electricity and electric appliances for any and all purposes ". The amount of capital stock was placed at $500,000.

In June, 1896, this company purchased all assets of the Potomac Light and Power Companies of Virginia and the District of Columbia respectively, for $255,000 cash, which was raised by the sale of stock of the new company. Since Crosby and Lieb owned all but thirteen shares of the Potomac Light and Power Company of Virginia, and were also the dominant figures in the Potomac Electric Power Company which bought the former, these individuals were, through the medium of their corporations, buying from and selling to themselves.

Thus, the Potomac Light and Power Company of the District of Columbia, and that of Virginia, went out of existence, leaving the field to the Potomac Electric Power Company and the U. S. Electric Lighting Co.

On or about August 5, 1896, the Pepco [1] was authorized by the Commissioners of the District of Columbia to install a number of arc lights for street illumination. The United States Electric Lighting Company contested the legality of this contract, but failed to sustain its case, the Supreme Court of the District holding that the power granted by Congress was not intended to confer exclusive rights to the United States Electric Lighting Company to serve the city of Washington.

The struggle for supremacy which followed was destined to be short lived, however, for during the year 1898, F. C. Stevens and others acquired approximately 4,854 shares of the latter company, and in February, 1899, complete control

[1] Potomac Electric Power Company.

was obtained with the use of funds borrowed from the United States Mortgage and Trust Company of New York. Competition between the two companies had virtually ceased before that time, however, and by the Spring of 1899 was abandoned entirely. The minutes of the U. S. Company

TABLE XXIII

COMPARATIVE STATEMENT OF EARNINGS *

UNITED STATES ELECTRIC LIGHTING COMPANY

Year or Period Ending	*Gross Earnings*	*Operating Expenses Taxes and Depreciation*	*Net Earnings*
Oct. 31, 1890	$153,692	$ 79,369	$ 74,323
1891	176,372	85,793	90,579
1892	230,359	125,753	104,606
1893	274,254	134,485	139,768
1894	294,403	251,228	43,175
1895	265,145	149,682	115,463
1896	287,123	249,436	37,687
1897	290,767	214,293	76,474
1898	296,472	166,694	129,778
Dec. 31, 1899	357,622	174,260	183,363
1900	368,387	289,777	78,610
1901	450,915	516,813	65,899 (d)
Sep. 30, 1902	376,488	247,493	128,994

POTOMAC ELECTRIC POWER COMPANY

Year or Period Ending	*Gross Earnings*	*Operating Expenses Taxes and Depreciation*	*Net Earnings*
Oct. 1, 1896	8,558	16,957	8,399 (d)
Dec. 31, 1896	8,960	8,725	235
1897	54,005	59,563	5,559 (d)
1898	73,983	49,482	24,502
1899	85,826	63,607	22,219
1900	113,916	125,317	11,401 (d)
1901	113,164	109,411	3,753
1902	238,998	167,092	71,906

* Taken from the Commission's Formal Cases 48, 49, and 50; Order no. 339 (Sep. 4, 1919), p. 38.

(d) denotes deficit.

under date of May 5, 1899, make reference to the fact that " through the consolidation of the office and working forces of the two companies a number of changes have been made, also a considerable saving in operating expenses ". Actual consolidation was formally effected as of September 30, 1902, when the United States Company sold its property, subject to the outstanding mortgage and floating debt, for $3,250,000 common stock of the Pepco.

Here also one group of individuals acted in the dual capacity of buyer and seller: for Stevens, Crosby, Lieb, and their associates owned both the U. S. Co. and the Pepco. Some idea of the volume of business done by the two companies may be had from Table XXIII.

Stevens, Crosby and Leib, on June 5, 1899, had formed still another corporation,—the Washington Traction and Electric Company (a holding company) to own certain securities of ten street and interurban railways, and two electric companies,—the U. S. E. L. Co. and the Pepco. But inasmuch as the promoters issued $12,000,000 of 4½% first mortgage bonds and $10,000,000 of capital stock against securities whose highest market price prior to January 1, 1899 aggregated less than $10,000,000, the Washington Traction and Electric Company soon went into receivership. It was reorganized as the Great Falls Electric Railway, whose name was soon changed to the Washington Railway and Electric Company. The latter thus came into control of the Potomac Electric Power Co.

Not content with mere control, the W. R. E. Co. soon acquired by purchase, the remaining common shares of the Pepco, thus obtaining 100% ownership which it has retained ever since.[2]

[2] Most of the historical data down to this point have been taken from Order no. 208 Formal Case no. 47 of the Public Utilities Commission of the District of Columbia, *passim*, and from the Pepco annual report for the year ended Dec. 31, 1925, on file in the office of the P. U. C., D. C.

Control of the Washington Railway and Electric Company in turn was acquired by the North American Company in 1928 after formation in 1922 of a syndicate managed by Edwin Gruhl, then vice president and general manager of the North American Company, and J. C. Matlock, president of the Central States Electric Corporation. This syndicate was organized to purchase not more than 32,500 of the 65,000 shares of common stock of the W. R. E. Co. at an average price not to exceed $65 per share. The syndicate was terminated May 13, 1925, but the North American Company continued to purchase stock. By the end of 1929 it had 95.5% of the common and 24.2% of the preferred, or more than 50% of the capital stock outstanding. Thus the North American Company, a holding corporation, controls the Washington Railway and Electric Company (both a holding and an operating company) which in turn owns the Potomac Electric Power Company (an operating company).[3]

2. CONFLICT: THE COMPANY VS THE COMMISSION 1914 TO APRIL 9, 1923

In an Act which became law March 3, 1899 congress placed its first and only limitation on prices which electric companies operating in the District of Columbia might charge. The maximum rate established at this time was 10 cents per kwh plus a penalty of one cent per kwh if bills were not paid within ten days.[4] This price remained in

[3] For further details as to the North American Company, see U. S. Federal Trade Commission, Utility Corporations, vols. 33-34, pp. 97-114. The reason for formation of a syndicate to purchase this stock, instead of its being acquired directly by the North American Company, is that the law of the District of Columbia at that time forbade a foreign corporation to own securities of Washington utility companies. This law was changed to permit foreign corporations to acquire such securities, March 4, 1925. (Public—no. 602. 68th Congress.)

[4] 30 Stat. 1052. The maximum price charged by the companies prior to this date was 15c. per kwh.

force without qualification until August 1, 1917; it was nominally in force from that time until December 31, 1924, when it was effectively reduced by order of the commission.

No important legislation affecting public utilities of the District of Columbia appears to have been enacted between 1899 and March 4, 1913, when the Act creating the Public Utilities Commission of the District of Columbia was approved.[5]

Paragraph 2 of this law provides that " every public utility doing business within the District of Columbia is required to furnish service and facilities reasonabiy safe and adequate, and in all respects just and reasonable, and that *the charge made for the same shall be reasonable, just, and non-discriminatory* ".[6]

But the fairness of a rate can be determined, said the commissioners, " only . . . by an ascertainment of the just amount or base . . . upon which a return is to be allowed to the Utility." [7] The commissioners were not alone in this view, for paragraph 6 of the Act creating the commission provides that " the commission shall ascertain, as soon and as nearly as practicable, the amount of money expended in the construction and equipment of every public utility . . . and " also the amount of money it would require " to *reproduce* the property. In other words, both original or historical cost, and the then current reproduction cost, were to be determined.

Therefore the commission proceeded in accordance with paragraphs 6, 7 and 8 of the Act, to place a fair value upon property used and useful within the District of Columbia

[5] 37 U. S. Statutes, p. 974.

[6] Italics not in the original.

[7] Formal Case No. 47, Order no. 208. *Valuation of the Potomac Electric Power Company*, p. 6. The following discussion of valuation is taken almost entirely from the records of this case.

for the convenience of the public "at the time of said valuation". It organized a valuation bureau and on June 1, 1914 the actual work began. On May 18, 1916 a report based on the commission's findings was transmitted to the company and the latter was notified that hearings on the valuation would begin June 26, 1916. These hearings continued (with several adjournments) until January 31, 1917. The testimony consisted of 6221 pages of typewritten matter and over fifty exhibits.

The company submitted no report on the *historical* cost of its property but its comptroller, in his testimony, dwelt at length upon that phase of the subject.

The commission found the following sum to represent "as nearly as practicable, the amount of money expended in the construction and equipment" of the property of the company:

TABLE XXIV

HISTORICAL COST OF PROPERTY OF THE POTOMAC ELECTRIC POWER CO. TO JUNE 30, 1914. FINDINGS OF THE COMMISSION

(*Figures to nearest dollar*)

Land, Buildings, Equipment, Cables, etc.	$8,334,106
Original Plants, Patents, etc.:	
Heisler Electric Co.	100,000
U. S. Elect. Lighting Co.	100,000
Potomac Light & Power Co.	208,190
Materials, Supplies and Miscellany	470,218
Total cost of property used and useful for electric operations	$9,212,514

Having thus found the so-called *historical* cost, the commission proceeded to find the *reproduction* cost of the company's property, as required by the law. "Reproduction cost" was defined by the valuation accountant for the commission as

the estimated normal cost to acquire the lands and reproduce the substantially identical physical property used and useful as of July 1, 1914, as a continuous process in the most efficient

manner humanly practicable, under the hypothetical condition that the present property is non-existent except for purposes of inventory.

The chief bone of contention between the Commission and the company as to the cost of reproduction arose from the fact that the commission based its estimate upon costs as of July 1, 1914, while the company maintained that costs as of July 1, 1916 should be used. The commission justified the earlier date on administrative grounds, holding that

some date should be fixed as a point about which the data with reference to the original cost and the cost of reproduction of this property should revolve; . . . this date should be fixed as of a time during the inventory such that with required accuracy, the inventory might be limited to property strictly existing on that date. July 1, 1914 was recommended by the Commission's experts as fulfilling this condition.

The commission found the cost of reproduction as of that date to be $11,090,229.[8]

In setting its *final* valuation on the property the commission gave "much weight to both the historical cost and the reproduction cost. . . . But," it said, "neither of these is determinative. Each must be considered in the light thrown upon the problem by the other. . . . After full consideration of all the evidence in the case, the Commission finds the fair value of the property of the Pepco used and useful for the convenience of the public within the District of Columbia as of July 1, 1914 to be $10,250,000.

[8] The commission justified reproduction cost thus: ". . . were it not for the hazy conditions surrounding certain early transactions, and the absence of a uniform policy of accounting throughout the history of the company, . . . historical cost . . . might be considered as more nearly approaching the true fair value. But without being able to clear up all the early history . . . the historical cost may not be accepted as fully determinative.

"The reproduction cost estimate . . . under the circumstances, is of much worth and is given decided weight by this commission."

" . . . Net additions to investment in the Company's property from July 1, 1914 to December 31, 1916" were found to be $981,170. Therefore, "the fair value of the property . . . as of December 31, 1916" was found to be $11,231,170 and was so ordered by the Commission.

The Company then filed notice of dissatisfaction with the findings, and petitioned for a retrial of the case. This was denied, whereupon the company filed a bill in equity (No. 35,336, Supreme Court of the District) seeking an injunction against the commission's valuation order No. 208 on the ground that it was "unlawful, unreasonable, and inadequate".[9]

Meanwhile, the commission proceeded with hearings on the rate of return to be allowed on the property as determined, and prices to be charged. These hearings continued at intervals during June and July 1917, and on July 13, the commission decided that "7% constituted a reasonable rate of return; that the rates, tolls and charges of the company were unjust and unreasonable;" and

that the maximum rate for current should be reduced from 10 cents to 8 cents per kilowatt hour; that the minimum monthly charge should be reduced from $1.00 to 75 cents; that the present point of division between the primary and secondary rates under schedule A should be changed from 120 hours' use, monthly, of the connected load to 60 hours, the rate for all current in excess to be 5 cents per kilowatt hour, and that the rate for street lamps should be reduced 10 per cent.[10]

The Company appealed to the court again, this time (Equity 35,341) for an injunction against enforcement of the order stating that the reasonableness of the rate of return and prices to be charged could not be determined until the valuation case was disposed of. The case was argued before

[9] Fifth Annual Report of P. U. C. D. C. (1917), p. 8.

[10] Formal Case No. 61. Also Fifth Annual Report of P. U. C. of D. C. Order No. 223, dated July 13, 1917, effective August 1, 1917.

Justice Gould of the District of Columbia Supreme Court on August 20, 1917 and on the following day the court awarded the injunction sought by the company, to be effective as of August 1, 1917, upon the following conditions: the company was ordered by the court to

make and preserve such records and accounts of its light or power furnished each customer . . . and of payments by them therefor, respectively, as in the event that this injunction shall be hereafter dissolved, the amount of any excess charges . . . paid by the consumers [i. e. those in excess of the rates ordered by the Commission] . . . may be readily determined . . . and repaid . . . by the plaintiff [the company] to the said consumers; [and to] execute and file . . . an undertaking with sufficient surety [i. e. a bond] to make good to the defendants and consumers, all damages. . . .[11]

The monies segregated in accordance with this order of the court, constituted the so-called *Impounded Fund,* which played an important part in the events leading to adoption of the sliding scale, and proved to be a formidable stumbling block at one stage in the negotiations between the company and the commission.

After four years of effort therefore, the commission was able to point to very little of a positive character that it had accomplished as far as regulation of the Pepco was concerned. The valuation case was in litigation and the rate order had been enjoined by the court.

Nearly three years more passed however, before Justice Gould of the District Supreme Court handed down his decision (Equity 35,336, March 2, 1920) sustaining the commission in its valuation.[12]

[11] Formal Case No. 61, page 206. Files of the D. C. Commission. Also, Fifth Annual Report P. U. C. of D. C., 1917, pp. 7-8.

[12] Eighth Annual Report of P. U. C., D. C. (1920), p. 95. Also P. E. P. Co. *v.* P. U. C., D. C., Washington Law Reporter, vol. xlviii, p. 162.

The company then took the case to the District of Columbia Court of Appeals where it was vindicated in a decision handed down November 7, 1921. The Appellate court pointed to the fact that paragraph 7 of the Act creating The Public Utilities Commission provides " that the commission shall value the property of every public utility within the District of Columbia . . . at the fair value thereof *at the time of said valuation* ".[13]

The court further noted that there must be a fair return to a public utility " upon the reasonable value of the property at the time it is being used for the public " citing cases.[14] Continuing, the court said

In the present cases the Commission, in effect, declined to find the present value of the property at the time it is being used for the public because [it is] not satisfied as to how long existing conditions will continue. In assuming this position the Commission must have overlooked paragraph 9 of the Statute authorizing it at any time, of its own initiative, to make a revaluation of the property of any public utility. . . . We are of the view therefore, that present cost of reproduction is one of the necessary elements for consideration, along with other relevant facts, in fixing the fair and reasonable value of the property. . . .

It follows that the decree must be reversed and the cause remanded for further proceedings. . . .[15]

The commission then took the case to the United States Supreme Court. On April 9, 1923 Chief Justice Taft delivered an opinion in which he held that the U. S. Supreme Court had no jurisdiction.[16]

[13] Italics not in the original.

[14] San Diego Land & Town Co. *v.* National City, 174 U. S., 739, 757. Minnesota Rate Cases, 230 U. S., 352, 434.

[15] 51 App. D. C. 77; 276 Fed. 327. Also Ninth Annual Report P. U. C., D. C. (1921), pp. 79-82.

[16] Paragraph 64 of the Public Utilities Law provides that "Any party, including said Commission, may appeal from the order or decree of said

When the U. S. Supreme Court thus threw out the case on April 9, 1923, it meant that the power company virtually had won the struggle, although as Chief Justice Smyth said in his opinion (dissenting from that of his associates in the Appellate Court) the latter did not instruct the commission *how much* the rate base should be increased by virtue of the rise in the general price level that had occurred between July 1, 1914 and July 1, 1916.

3. CONFLICT: THE COMPANY VS THE COMMISSION (APRIL 9, 1923 TO DECEMBER 31, 1924)

As a result of the chaos left by the foregoing decisions the commissioners began to seek some new basis for agreement.

Informal conferences were held with the power company during the remainder of the year 1923 and all of the year 1924. The problems involved, it was found, came under four heads, which therefore constituted the real issues. They were,

(1) The rate base;
(2) The rate of return on the rate base;
(3) The price of electricity; and
(4) Disposition of the impounded fund.

court [D. C. Supreme Court] to the Court of Appeals of the District of Columbia, and therefrom to the Supreme Court of the United States, which shall thereupon have and take jurisdiction in every such appeal."

The court then called attention to the fact that ". . . proceedings to review the orders of the Commission authorized by Paragraph 64 are expressly required to conform to equity procedure. In that procedure an appeal brings up the whole record and the Appellate Court is authorized to review the evidence and make such order or decree as the court of first instance should have made. . . . This court is, therefore, given jurisdiction to review the entire record and to make the order or decree which the Commission and the District courts should have made.

"Such legislative or administrative jurisdiction, it is well settled, cannot be conferred on this court either directly or by appeal". (See Keller *v.* Potomac Electric Power Co., 261 U. S. 462 and 67 L. Ed. 731. Also Eleventh Annual Report of P. U. C., D. C. (1923), pp. 63-66).

Of these items, the first and the fourth assumed greatest importance as the negotiations continued. The company had the law on its side as far as the rate base was concerned and could have demanded a valuation calculated largely in terms of current costs of reproduction. On the other hand, the company sought at least a major portion of the impounded fund which had grown beyond all expectations, mainly because of the enormous increase in consumption that took place during the period. The total amount, including interest, was over six million dollars at the end of 1924. The accretions by years were as follows:

THE IMPOUNDED FUND

(*Figures to the nearest dollar*)

Date	*Principal*	*Interest*	*Total*
1917 *	$ 140,145	$ 1,855	$ 142,000
1918	403,455	21,513	424,968
1919	462,271	47,641	509,912
1920	533,122	78,574	611,696
1921	566,230	109,690	675,920
1922	929,044	154,577	1,083,621
1923	1,155,382	219,813	1,375.195
1924	1,284,865	293,400	1,578,265
Total	$5,474,514	$927,063	$6,401,577

* After August 1.

The commissioners, however, had made up their minds that if the company was given a high cost rate base, it would have to forgo all or most of the fund, allowing the latter to revert to consumers; if it accepted a lower cost rate base, it would then be entitled to an appropriate share of the fund.[17]

[17] When one looks at the company's earnings one sees ample justification for the commission's attitude. In Table XXVII we note that average earnings on common stock amounted to 14% for the period 1914 to 1924 (inclusive); and that in 1924 the company earned 25%. These figures take no account of the impounded fund. Earnings during the period in question (plus half the impounded fund pro-rated) upon a rate base which now appears equitable in the light of experience, averaged

The controversy dragged on despite the fact that the company, the commission, and the public, were weary of the struggle which had persisted for more than seven years. What was needed, was a new approach, a reorientation, and some new ideas, so that the threadbare issues might be seen in a new light and disposed of according to a new formula.

This new approach was soon suggested by a man who came into the picture quite unexpectedly. On September 13, 1924 Major W. E. R. Covell, U. S. A., was appointed assistant to the chairman of the Public Utilities Commission and was at once detailed to study the Pepco controversy (as well as to acquaint himself with the powers and duties of the commission). While reading the law creating the commission he noted paragraph 18 particularly,—which reads in part as follows:

> That nothing in this section shall be taken to prohibit a public utility, with the consent of the commission, from providing a sliding scale of rates and dividends according to what is commonly known as the Boston sliding scale. . . . Such arrangement shall be under the supervision and regulation of the commission . . . but the right and power to make such other and further changes in rates, charges, and regulations as the commission may ascertain and determine to be necessary and reasonable, and the right to alter or amend all other orders relative thereto, is reserved and vested in the commission notwithstanding any such arrangement and mutual agreement.

8.76%; during and after the year 1921 the annual rate exceeded the average; and in 1924 it amounted to 10.49%.

Of course, it makes little difference in the end, whether the rate base is high and the rate of return low, or the rate base low, and the rate of return high. Seven per cent on a million dollar rate base is the practical equivalent of 10% on a $700,000 rate base, except that the layman is more likely to protest against a 10% return, than he is against a high rate base, because he has no direct means of knowing whether the rate base is excessive or not. In the present case, when the company began to experience difficulty in getting a rate base as high as it sought, it attacked the problem from the other angle, insisting upon a 7½% return, instead of 7% as ordered by the commission.

Covell's suggestion that the provisions of this paragraph be utilized, injected a new spirit of hopefulness into the minds of the negotiators, and from that time on matters moved more rapidly and earnestly. The same issues remained, but there was a greater willingness to compromise. During the months of October, November, and most of December (1924) the company and the commission gathered figures, made elaborate calculations, and reconsidered all aspects of the problem in light of the proposed sliding scale. At length an agreement was reached on the four issues, and on December 20, 1924 counsel announced to the court that "all matters in controversy" had been settled to the satisfaction of both parties. The terms of the settlement were then reviewed by the court and found to be fair, reasonable, and consistent with the public interest; whereupon they were embodied in a decree. This we shall consider after giving attention in Section 4 to an assault which was being made upon the company by certain members of Congress.

4. THE CLUB OF COMPETITION [18]

While the company and the commission were attempting to reach an agreement, a collateral contest between the company and congress was taking place. There had been per-

[18] Material in this section has been taken largely from *Hearings Before the Subcommittee of the Committee on the District of Columbia, House of Representatives*, 68 Congress, First Session (Washington, G. P. O., 1924).

See also Senate Document no. 403, 66 Congress, Third Session (Washington, G. P. O., 1921).

Congressional Record, vol. 61, part 3, 67 Congress First Session, pp. 2232-2235; vol. 65, part 1, 68 Congress, First Session, p. 147.

Power Authority of the State of New York, *Research Bulletin on the Potomac Electric Power Company of Washington, D. C.* (December, 1934).

Notwithstanding the fact that the company and the commission settled their major differences by the Consent Decree of December 31, 1924, the proposal to develop water power at Great Falls is still alive in congress.

sistent agitation in both the senate and the house of representatives for years, in favor of developing hydro-electric energy at the Great Falls power site on the Potomac River.[19] The first definite step was taken in 1920 when Congress attached a rider to the bill creating the Federal Power Commission, directing it to investigate the practicability of building a generating station at Great Falls. Six months later the Federal Power Commission submitted the results of an investigation which had been made for the commission by Major M. C. Tyler.[20]

The Tyler report declared the proposal to be feasible from an engineering standpoint, and desirable from that of economy. It calculated the cost at $44,421,000 and estimated the generating capacity at about 750,000,000 kilowatthours per year. Although the City of Washington was at that

[19] The Great Falls power site is located about twelve miles in a direct line northwest from the center of the District of Columbia. The Washington Railway and Electric Company acquired 3,334 shares of stock (a two-thirds' interest) in the Great Falls Power Company on November 26, 1902, for $425,000. No plant or equipment of any kind was built by the Great Falls Power Company. On May 27, 1912, the W. R. E. Co. agreed to sell this two-thirds' interest (3,334 shares) to the Pepco for 10,000 shares ($1,000,000 par value) which were issued by the Pepco for this purpose, thus increasing its capital stock from $5,000,000 to $6,000,000.

The title of the Pepco to the site is evidently not as good as it might be, and this may account in part for its not being developed. One of the claimants is the Chesapeake and Ohio Canal Company, successor to the "Potomack Company" organized under the laws of Maryland in 1784, which had perpetual and prior use of the water for navigation purposes. George Washington was one of the organizers of the Potomack Company.

The second claimant is the Federal Government, which owns land at the site and has constructed a dam for the purpose of providing an adequate supply of water in the District.

It is said that the Pepco acquired its interest in the Great Falls Power Company to prevent the Federal Government from obtaining it. (See *Valuation Orders and Opinions*, P. U. C. D. C. Formal case no. 47, order no. 208, p. 83 *et seq.*)

[20] Senate Doc. 403, 66:3.

time consuming only a little more than a hundred million kwh per year, the proposed plan involved the sale of surplus power to other municipalities along the eastern seaboard within a radius of about 200 miles. The plan received the endorsement of the commissioners of the District of Columbia, the Federal Power Commission, and the committee on rivers and harbors.

The senate took immediate cognizance of the report and adopted an amendment to the army appropriation bill on June 8, 1921, allocating $200,000 to cover the initial expenses of constructing one of the necessary dams. By the time the bill reached the House, however, this amendment had been stricken out and no further action on Great Falls was taken by that congress.

Agitation, nevertheless, persisted in favor of the plan, and in the latter part of 1923 Senator Norris introduced a bill (Senate Bill 746) which, if enacted into law, would have resulted in the development of electric energy at Great Falls. But when the bill reached the subcommittee (of the committee of the House on the District of Columbia) the latter held an eleven-day hearing at which representatives of the Pepco, various banking groups, and others who upheld the private rather than the public point of view, testified against the use of public funds for the development of water power resources. The sub-committee then adjourned, not to resume its deliberations until December 5, 1924. No testimony was taken at this time, and the committee again adjourned without disposing of the question, possibly because the company and the commission had in the meantime begun to discuss terms of agreement.

Members of the Public Utilities Commission of the District of Columbia and an official of the North American Company believe that this sabre-rattling threat of public competition had nothing to do with the fact that the com-

pany agreed to settle the question without further delay. Their point of view appears the more credulous, in light of the fact that President Coolidge, who continued in office as a result of the election in November 1924, would doubtless have vetoed any bill to develop water power at Great Falls under government auspices.

5. AGREEMENT: THE CONSENT DECREE OF DECEMBER 31, 1924

THE LEGAL NATURE OF A CONSENT DECREE

The important provisions of the Consent Decree of December 31, 1924, are as follows:

IN THE SUPREME COURT OF THE DISTRICT OF COLUMBIA

Potomac Electric Power Company, Plaintiff,
vs.
Public Utilities Commission of the District of Columbia, *et al*, Defendants.
} In Equity No. 35,336.

and

Potomac Electric Power Company, Plaintiff,
vs.
Public Utilities Commission of the District of Columbia, *et al*, Defendants.
} In Equity No. 35,341.

DECREE

The cause first above mentioned was heretofore fully argued by counsel and submitted on the 12th day of February, 1924, and was maturely considered by the Court upon said argument and briefs thereafter furnished, until the 20th day of December, 1924, on which date counsel announced that the parties themselves were able to reach an agreement not only settling all

matters in controversy in said suit first mentioned, but in the second suit also, bringing the valuation of the plaintiff's property down to the present time, and also establishing a sliding scale as a basis upon which rates should be made in the future. On consideration whereof and upon motion, it is ORDERED this 31st day of December, 1924, that these two causes be consolidated and hereafter heard together, and they were so heard this day, and it appearing to the Court that the agreement above mentioned between the parties fixes the valuation of the property of the plaintiff used and useful in electric operations as of the 1st day of January, 1925, but not including any of the property excluded by the Commission from its valuation as not used or useful in electric operation, at a figure deemed fair and just by the parties and approved by the Court, and therefore avoids the necessity of a specific finding by this Court as to the fair value of said property as of December 31, 1916, which agreement is as follows:

1. The Commission to determine fair value of property now used and useful as of January 1, 1925, of $32,500,000, including Maryland property.

2. On the depreciation reserve as of December 31, 1924, approximately $4,000,000, interest will be accrued on a 4% basis and treated as an accretion to the reserve, lessening the amount of depreciation to be included as an expense of operation. Depreciation is to be based upon a modified straight line basis described in the method below:

> When the Depreciation Reserve is below 15% of the value of property indicated above, plus additions, the following rate applies—2.3% of said value.
>
> When the Depreciation Reserve is 15% of the said value, but less than 16% of said value the following rate applies—2.1% of said value.
>
> When the Depreciation Reserve is 16% of the said value, but less than 17% of said value the following rate applies—1.9% of said value.

When the Depreciation Reserve is 17% of the said value, but less than 18% of said value the following rate applies—1.7% of said value.

When the Depreciation Reserve is 18% of the said value, but less than 19% of said value the following rate applies—1.5% of said value.

When the Depreciation Reserve is 19% of the said value, but less than 20% of said value the following rate applies—1.3% of said value.

Thereafter the accretions to the Depreciation Reserve shall be such as not to make the total of said reserve in excess of 20% of the value of property as stated above plus additions.

3. Rates for 1925 to be based upon a return of 7½% on the above named value, namely $32,500,000, plus estimated cost of additions undepreciated and weighted. . . .[21]

4. If the rates hereafter yield more than a 7½% return on $32,500,000 plus actual cost of future additions undepreciated but weighted during a period of any one year, one-half of said excess shall be used in a reduction of rates to be charged the public for electric service thereafter, thereby providing a sliding scale of rates under provisions of paragraph 18 of the Act creating the Public Utilities Commission, advantageous to the public and Company alike, that is to say, by way of example, if the return for any one year should amount to $100,000 over and above 7½% on the base ascertained as aforesaid then the rates for the succeeding year to be charged the public shall be automatically reduced by the filing of new rate schedules to absorb $50,000 of such excess during such year.

5. If the average return for any consecutive 5-year period fall below 7½% on the base ascertained as aforesaid, or if the average return for any consecutive 3-year period falls below 7% on the base ascertained as aforesaid, or if the average return for any consecutive 12-month period falls below 6½% on the

[21] See Sec. 10 for discussion of weighting.

base ascertained aforesaid, the Commission shall promptly increase rates so as to yield 7½% on the base ascertained as aforesaid.

6. The impounded fund, with interest to December 31, 1924, less District of Columbia Franchise and Federal income taxes is to be divided equally between consumers and the Company. Interest on that portion of the impounded fund which reverts to consumers to cease on December 31, 1924. Any income after January 1, 1925, on that portion of the impounded fund to be refunded to consumers shall be applied toward the cost of distribution of amounts due them.

7. The Company to make refunds as promptly as possible or as the order of the court may direct.

8. Any amounts due consumers which may be unclaimed at the end of a period to be prescribed by the Court shall be considered as income of the Company and prorated over a term of twenty years.

. . . . . .

By the Court,
WENDELL P. STAFFORD,
Justice.

CONSENT:

F. H. STEPHENS,
General Counsel, P. U. C.

JNO. S. BARBOUR,
S. R. BOWEN,
Counsel for Plaintiff.

DECISION HANDED DOWN—DECEMBER 31, 1924.

(*Note:* The terms of the Consent Decree were modified as of June 8, 1931, Order No. 919. *Cf. infra,* sec. 9.)

Some details of the Consent Decree, omitted at this point for the sake of brevity, will be considered later. The agreement embodied in the decree settled each of the four basic controversial issues as follows:

1. The Rate Base: The commission found the historical cost of property used and useful on July 1, 1914 to be $9,212,514 (Order No. 208, May 2, 1917), which included $263,893 for working capital, material, and supplies. The latter may be deducted (inasmuch as another amount representing these items as of December 31, 1924 was included in the rate base finally adopted), leaving $8,948,620. Net additions and betterments *at cost* from July 1, 1914 to December 31, 1924 amounted to $14,589,777. Working capital, material, and supplies on the latter date amounted to $874,468. Adding these figures we have,

Historical cost as of 7-1-14	$9,212,513
Less W. C. M. and S.	263,893
	$8,948,620
Net additions and betterments from 7-1-14 to 12-31-24	14,589,777
W. C. M. and S	874,468
Original cost of Rate Base (As of 12-31-'24)	$24,412,865

The company objected, contending that due consideration should be given reproduction cost, going concern value, and other items. In applying these elements the company derived a value of roughly $44,000,000, 80% above the commission's finding.

The company was justified in light of the court decisions in demanding that reproduction cost be considered. But the court did not say *how much* weight should be given to reproduction cost. In the end, both sides yielded in adopting $32,500,000, which is 26% below what the company wanted, and 33% above cost.

No formula founded on logical or statistical premises was employed in deriving this rate base. The amount finally agreed upon was a compromise figure based on no single theory of valuation, but on a combination of most of them.

It must be emphasized again, however, that the problem to be solved was quadrangular in character, and that the rate base was only one angle. The commission had so to adjust the four items that when settled they would form a symmetrical and harmonious system. Whether or not the rate base was equitable can be decided only with reference to the other controversial points.

2. The Rate of Return on the Rate Base: As early as July 13, 1917 the commission held that 7% was a reasonable rate of return (Order 223). In the consent decree, however, the rate was placed at 7½% with the proviso that "if the rates . . . yield more than a 7½% return . . . during a period of any one year, one-half of said excess shall be used in a reduction of rates to be charged the public for electric service thereafter, thereby providing a sliding scale of rates. . . ."

On the other hand, "if the average return for any consecutive five year period falls below 7½% on the base . . . or for any consecutive three year period, . . . below 7% . . . or for any consecutive twelve-month period . . . below 6½% on the base . . . the commission shall promptly increase rates so as to yield 7½% on the base. . . ."

Therefore 7½% was the basic rate of return under the decree. While this represented a concession by the commission of one-half of one per cent, the company yielded a point of substantial importance in adopting the sliding scale provision for the adjustment of prices. This provision, as we shall see, tends to take the lag out of ordinary regulatory procedure.[22]

[22] Under ordinary processes of regulation, efforts on the part of commissions to reduce prices often require months, if not years, during which time the company continues to charge prices which the commission alleges to be excessive. Under the sliding scale, however, prices to consumers are adjusted automatically at the end of each twelve-month period.

3. Prices: The *billing* rate in effect at the time the consent decree was ordered by the court, was 10c per kilowatthour for the first 120 hours' use of the connected load, 5c for excess use, and $1.00 the minimum charge. Prices ordered by the commission, effective for impounding purposes (but not enforceable because of the injunction) prior to the consent decree were 7.6c per kilowatthour for the first *sixty* hours' use monthly of the connected load, and 5.225c for excess use. Those agreed to in the decree were 7.5c for the first *120* hours' use of the connected load, 4.5c for excess use, and a minimum charge of 75c. It is difficult to see how the new rates represented an important concession by the company.

4. The Impounded Fund: Money in this account (amounting on December 31, 1924 to $6,401,576.81) was to be divided equally between the company and the consumers, after the deduction of $500,000 for taxes. All but about $300,000 of the amount due consumers was refunded within the allotted three years. Five per cent, or $15,000 of this unrefunded amount, is added to gross income of the company each year (so that within twenty years the entire sum will be absorbed) and this increases the divisible surplus available for rate reduction.

Legal Characteristics of the Consent Decree

The legal character of the instant decree has never been adjudicated *per se*. Strictly speaking, it is not a contract because the commission, being a non-corporate body, is incapable of making a contract.[28] Moreover, the commission seemingly is estopped from making an agreement which would bind successor commissioners. On the other hand, there is grave doubt that the court would permit the com-

[28] The P. U. C. D. C. functions as a legislative committee, with only those powers which have been delegated to it by congress.

pany or the commission to abrogate the agreement on grounds of mere dissatisfaction with its operation, especially in view of its flexibility as attested by the decision of Justice Luhring (July 27, 1932. *Cf. infra* Sec. 7 & 9) acknowledging the commission's right " to alter or amend the existing sliding scale arrangement ". The validity of an order issued today by the commission under the consent decree, therefore, can hardly be questioned on grounds of the commission's jurisdiction or authority, but it may be on grounds of *reasonableness.*

After the present commissioners pass from office it remains to be seen whether the court will regard the consent decree as a hereditament of incoming commissioners. It seems highly probable that it will, because the decree reduces contention between the parties at interest by making rate base and price adjustments automatic.

6. OPERATION OF THE SLIDING SCALE (JANUARY 1, 1925 TO DECEMBER 31, 1932.)

On December 31, 1925 (first anniversary of the sliding scale) earnings in excess of 7½% on the rate base amounted to $702,777. If production costs per kilowatthour did not change and consumption remained the same, how soon would the sliding scale reduce earnings to 7½%, and the price of electricity to the lowest level commensurate therewith?

An excess of $702,777 on December 31, 1925 would indicate a reduction of prices effective in 1926, sufficient to absorb one-half of this amount (according to the terms of the decree then in effect). The company would retain the full $702,777 earned in 1925, but in 1926 it would have an excess (under static conditions) of $351,388.50 or half the previous year's surplus. In 1927 the excess would be $175,694; in 1928, $87,847, and so on until 1945 (although there would be no substantial reductions after 1930), when

the price of electrical energy would be at the lowest level consistent with the company's right to earn 7½%.

Actual developments since December 31, 1924 differ from those outlined above because the assumption of purely static conditions is out of harmony with reality. The cost of producing a unit of electrical energy has gone down during recent years because of improvements in production and a better load factor; consumption, moreover, has increased both absolutely and relatively. Consequently, the company's earnings have remained consistently above the basic rate fixed by the commission, notwithstanding the fact that the price to consumers has dropped from among the highest in the United States to one of the lowest.

Order No. 588 effective January 1, 1926, reduced prices generally. The basic residential price was changed from 7.5c to 7c per kilowatthour for the first 120 hours and 4.5c for amounts used in excess.

During 1926, the number of kwh sold was 17.6% greater than in 1925, and the amount earned on the rate base was 9.72% which represented an excess of $800,588. Accordingly, the commission's rate order 656, effective January 1, 1927, lowered prices sufficiently to absorb about $400,000 or half of the previous year's excess. In 1927 the company earned 9.22% on the rate base (slightly less than the year before) the excess amounting to $698,501.

Another reduction in prices, effective January 1, 1928, lowered the basic price for residential consumption to 5.9c, notwithstanding which the company earned 10.28% in 1928 (a return exceeded only once between 1914 and 1928, i. e., in 1924, and then only if half the impounded fund is added to income), the excess amounting to $1,220,991.

The price for domestic consumption, effective January 1, 1929, was reduced to 5.2c, while the return earned on the rate base in 1929 rose to 10.31%, and excess earnings amounted to $1,348,838.

The basic domestic price was then reduced to 4.7c per kwh for the year 1930. Five years before, residential consumers were paying a primary rate over 60% higher than this, while the company sought to maintain and was billing its domestic customers at a rate nearly 113% higher.

Despite the reduced prices, 1930 proved to be the most prosperous year in the company's history, excess earnings amounting to $1,580,666 and the rate of return 10.7%.[24]

Prices effective January 1, 1931 were reduced; yet, despite this, and the fact that 1931 was a year of severe depression, 10.4% more electricity was consumed than during the year 1930 and the company earned 9.56% on the rate base, the excess above 7½% amounting to $1,133,854.

7. CONFLICT AGAIN

In consequence of the company's large and persistent super-normal earnings the commission decided early in the year 1930 to reappraise the sliding scale. On December 30, 1930 a public hearing was opened " for the purpose of receiving evidence as to the reasonableness, justice, and equity of all rates and charges of the Pepco . . . the consent decree . . . *and the rate of return under existing and proposed prices*".[25]

At the close of the hearings the commission reported (a) its general approval of the sliding scale as a means of regulation; and (b) its belief that the company's current return was excessive. On June 8, 1931 the commission accordingly issued Order 919 which reduced the basic rate of return

[24] However, the number of kilowatthours sold was only 13.4% greater than that of the previous year, while the average increase from 1925 to 1930 (both inclusive) was 14%. A probable explanation of the large surplus lies in the fact that the general commodity price level and hence the cost of operation, declined more than the price of energy.

[25] Formal Case 220, 18th Ann'l Report, P. U. C. D. C. (1930), p. 55 *et seq.* Italics not in original.

from 7½% to 7%, and increased the proportion of excess earnings to be used in reducing prices.[26]

On September 24, 1931, the company gave notice of dissatisfaction with the order, on the ground that it was "irregular and defective on its face, . . . contrary to law, and violative of the rights of the Potomac Electric Power Company under the Constitution of the United States."

The company's main argument rested on the claim that the consent decree established the method and basis of regulation which could not be changed except by the court.

The commission, and People's Counsel (Mr. R. B. Keech) as intervener countered with the reply that paragraph 18 of the Act creating the commission and authorizing the sliding scale specifically empowers the commission to alter the scheme. (See excerpt from paragraph 18, p. 114 *supra.*)

Since the statute empowered the commission to continue the exercise of its rate-making function as conditions changed, People's Counsel maintained that the sole remaining question pertained to the reasonableness of the order. As to this, it was argued, there could be no question. On the 27th of July, 1932 the court decided in favor of the commission, and modified the consent decree so as to make a larger portion of super-normal income available for price reduction. The company, however, perfected an appeal in the Appellate Court and thus estopped the commission from enforcing the modified arrangement.

8. THE CLUB OF COMPETITION AGAIN

On the twenty-ninth day of July, 1932 (the date of the company's appeal) President Hoover approved an act of

[26] Corresponding provision was made for price increases if the rate of return fell below 7%. Table XXVIII reveals the fact that while the *average price* per kwh. sold declined from 4.10c. in 1924, to 3.22c. in 1930, a drop of 21.5%, the total over-all *expenses of operation* fell from 2.6c. per kwh in 1924, to 1.65c. in 1930, or 36.5%, which indicates a lag of 15% between prices and production costs.

congress directing the commissioners of the District of Columbia to make a survey of the power needs of the District of Columbia "*with a view to establishing a municipally owned and operated service*". The Commissioners engaged Mr. Otto M. Rau to make the study. His report, submitted to the Commissioners on December 1, 1932, suggested three alternatives:

(1) A municipal plant (to meet the District's total needs) which would save consumers about $4,000,000 annually.

(2) Municipal ownership and operation of the street lighting system, energy being purchased. Estimated saving, $200,000 or 30%.

(3) A limited municipal system confined to the area in which the Government's major activities are concentrated. Estimated saving plus profit from sale to private consumers within the area, $1,000,000 annually.

No action was taken on any of these proposals, possibly because the Pepco again buried the hatchet.

9. AGREEMENT

Meanwhile, as the case was pending before the Appellate Court of the District of Columbia, the company and the commission came together for a second time to settle their differences out of court. The case was then remanded by the Appellate Division to the District Supreme Court, which embodied the terms of settlement effected by the contending parties, in a new consent decree dated February 8, 1933, according to which the proportion of super-normal income henceforth available for price reduction was to be as follows:

%			%		%
50	of income	between	7	and	8¼
60	" "	"	8¼	"	9
75	" "	over	9[27]		

[27] Corresponding provision is made for price increases "if the rate of return for any two consecutive years falls below 6¾% . . . for each of

This struggle for modification marked a critical stage in the history of the sliding scale system of regulation. Had the court taken the view that the original terms of the consent decree were to remain in effect, to all intents and purposes during the indefinite future, the sliding scale would have become a stereotype, unresponsive to the real world of change, and not appreciably different in this respect from the old perpetual franchise in which the granting body sought to provide for all possible future contingencies.[28]

10. THE RATE BASE

The compromise rate base valued at $32,500,000 which was adopted in 1924 exceeded the commission's original cost figure by $8,000,000 or 33%. Additions and replacements, however, enter the property account at cost; therefore the $66,000,000 valuation as of 1935 is virtually an original cost base.

Both consent decrees provide that the value of property used and useful " shall be determined by taking the last value ascertained prior to the beginning of " a given " twelve month period, adding thereto the net additions and betterments during said period, undepreciated[29] but *weighted* ".[29] The weighting process here referred to is for time. Property installed during a given year, increases the rate base for that year in proportion that the period of use bears to the

the two said years or . . . for any consecutive twelve month period falls below 6½% . . . , so as to yield as nearly as may be 7% on the rate base . . . "

[28] Although the company opposed modification, the precedent established by the court may in the future redound to the company's advantage. For if the commission is free to appeal for change in the agreement in case it proves too liberal, the company presumably is at liberty to do likewise if it proves too niggardly.

[29] See next section for discussion of depreciation. Italics not in original.

entire year. Thus, additions and betterments installed in January would increase the value of the rate base for that year 11.5/12 or 95.833% of the cost of such additions and betterments. Those installed in February would increase the value 10.5/12, or 87.5% for that year, and so on till December when the proportion would be .5/12, or 4.167%. After the calendar year in which installation occurred, has elapsed, the additions and betterments enter the rate base at full cost value.

The process may be illustrated for the year 1925, at the beginning of which the rate base equaled $32,500,000. Additions and betterments during the year 1925 were as follows:

	Cost Value			*Weighted Value*
January	$156,518	× 11.5/12 or .95833	=	$149,996
February	112,800	× 10.5/12 or .875	=	98,700
March	119,662	× 9.5/12 or .79167	=	94,733
April	313,019	× 8.5/12 or .70833	=	221,721
May	127,218	× 7.5/12 or .625	=	79,511
June	175,082	× 6.5/12 or .54167	=	94,837
July	183,138	× 5.5/12 or .45833	=	83,938
August	166,638	× 4.5/12 or .375	=	62,489
September	146,522	× 3.5/12 or .29167	=	42,736
October	182,906	× 2.5/12 or .20833	=	38,105
November	176,265	× 1.5/12 or .125	=	22,033
December	208,976	× .5/12 or .04167	=	8,708
Unweighted	$2,068,744	Weighted		$997,507
Increase during 1925, in Working Capital, Material and Supplies				110,682
Value of Rate Base Dec. 31, 1924				32,500,000
Weighted value of rate base for the year 1925				$33,608,189*

*All figures to nearest dollar.

II. DEPRECIATION

Paraphrasing that part of the decree which deals with depreciation, we note that

When the depreciation reserve is between	%	of the value of the rate base, the company is required to charge the following percentages of the value of the rate base to operating expense: *	%
	0 and 15		2.3
	15 " 16		2.1
	16 " 17		1.9
	17 " 18		1.7
	18 " 19		1.5
	19 " 20		1.3
	20+		0

* Less interest at 4% on the reserve. See later discussion in this section.

The origin of these depreciation rates deserves a word of explanation. Prior to the agreement of December, 1924, the company was compensating for depreciation in accordance with a table which the valuation engineer for the commission prepared during the period 1914-'16. The rates were on a straight line basis and were applied to the assumed original cost of each class of property no consideration being given to salvage value.

Applying these individual rates for each class of property, to the total property in existence on December 31, 1934 the commission arrived at a composite rate of 2.4% of the rate base, per year. But as the rate base adopted in the agreement was padded, the commission reduced the composite maximum rate to 2.3%, from which it decreases to zero when the reserve exceeds 20% of the value of the rate base. When the decree became effective the depreciation reserve amounted to $3,981,702.50, or 12.25% of the rate base. Therefore, the 2.3% rate applied.

In the first decree, a paragraph provided that on the depreciation reserve then existing ($3,981,702.50) " interest will be accrued on a 4% basis and treated as an accretion to the reserve, lessening the amount of depreciation to be included as an expense of operation." To illustrate: 2.3% of $32,500,000 is $747,500 (the amount chargeable when the rate base was $32,500,000); but not all of that amount would be charged to operating expense inasmuch as $159,268

(4% of the existing reserve) must be credited to the depreciation account according to the decree. Therefore, the difference between $747,500 and $159,268, or $588,232, is the amount which would be charged to operating expense during the year in question for depreciation.

The annual accruals and amounts charged respectively to operating expense and income (as interest on the current reserve) are shown in the following table.

DISTRIBUTION OF THE DEPRECIATION BURDEN

Year	*Total Accrual*	*Am't Ch'gd to Operating Expense*	*Am't Borne by Company (4% on Reserve)*	*% Borne by Company*
1925	$768,473	$596,183	$172,290	22.41
1926	822,112	621,114	200,998	24.44
1927	921,451	692,959	228,492	24.79
1928	982,456	722,467	259,989	26.46
1929	992,677	699,597	293,080	29.52
1930	927,756	600,911	326,845	35.22
1931	1,051,020	690,533	360,487	34.29
1932	1,084,109	691,674	392,435	36.19
1933	1,043,339	617,381	425,958	40.82
	$8,593,393	$5,932,819	$2,660,574	30.96

The company's contribution has been increasing year by year,—from 22.41% in 1925 to 40.82% in 1933. Not only have prices paid by the public been $2,660,574 lower in the aggregate as a result of the company's contribution, but excess earnings have been greater by the same amount, more than half of which (over $1,300,000) has been utilized in price reductions.

Under this arrangement, however, the company is permitted to earn 7% (7½% prior to January 1, 1933) on the reserve, but it pays only 4% into the depreciation account, thus retaining 3% as a virtual unearned increment. As the entire reserve has been provided by the consuming public, a more equitable plan would require the company to pay the same annual rate on that part of the reserve which is offset

by rate base property as it earns on the rate base. On that part of the reserve represented by liquid assets (bonds and cash) 4% may be a reasonable assessment.

The other side of the question rests on an assumption that the public acts as banker, lending funds (the depreciation reserve) to the company which uses the money to enlarge and improve its plant. If 4% is below the current market rate of interest the public gains in the long run by a lower cost of production.

But the company gains immediately and continues to get more than the public for at least five years. (See Sec. 6.) Even then the plan will not have diverted the company's advantage entirely to the consumer's pocketbook through the process of price reductions.

The preceding discussion applies to the annual charges for depreciation. Let us now see how the reserve as a whole is treated from an accounting standpoint. The consent decree provides that the rate base shall be *undepreciated,* which means that the reserve for depreciation shall not be subtracted from the rate base in determining its value for rate making purposes.

The propriety of deducting a reserve from the rate base has been discussed in a penetrating article by Prof. Bonbright.[30] The difficulty of applying the criteria he suggests

[30] Bonbright, James C., "Depreciation and Valuation for Rate Control", xli *Quarterly Journal of Economics*, Feb. 1927, p. 185 *et seq.* His concluding remarks are as follows: "When rates . . . are controlled on a strict investment basis, depreciation of the physical property is wholly irrelevant. On the other hand, when charges are made to yield a return on the reproduction cost of the property, both accrued depreciation and obsolescence should be fully deducted. It is only under the compromise rate base, 'historical cost' of present property, that the problem of deducting or not deducting depreciation admits of any reasonable doubt; and here the practical choice must be left to those non-logical considerations of give and take, which form the basis of most compromises".

In explanation of his reason for considering the historical cost rate base a compromise, he says that it is "a hybrid,—a cross between the

in this article, however, lies in the fact that the Pepco rate base was determined according to not one standard, but two, the respective importance of each being unknown.

Property installed prior to December 31, 1924 was taken into the rate base at a compromise figure in the determination of which reproduction cost played a part, but how important a role neither company nor commission is able to say; while additions and betterments since 1924 have entered the rate base at cost. Thus it is a *hybrid* of a more complex type than Prof. Bonbright has made allowance for. Yet the depreciation policy must apply to it *as a unit,* irrespective of its inherent composition.

However, the vital problem is to see that property provided by the consuming public is not allowed to increase the rate base and thus provide unearned income to stockholders. It cannot be pointed out too often that a depreciation reserve is ordinarily offset by property used and useful in the public service and therefore a part of the rate base.[81]

investment principle [that based on the actual amount of funds required to finance the business] and a 'present value' principle. While the former principle looks to the funds contributed by security holders, and the latter looks to the property resulting from the investment of those funds, the historical-cost basis takes a Janus-faced view of both circumstances".

[81] Of course, a portion of the depreciation reserve may be an offset, not to property, but to other assets such as bonds and cash. In this case, the fund so invested should be subtracted from the reserve, and the balance then subtracted from the rate base, in order to get the true amount on which the company is entitled to earn a return.

The principles involved may be illustrated by a simple example. Assume that the rate base has a value of $1,000,000, which is offset by stock of the same amount; and that the property has a life of forty years, and no scrap value. The depreciation reserve, therefore, would accumulate at the rate of 2.5% per year. As long as the original property is in service, the depreciation reserve should be subtracted from the rate base. At the end of the fortieth year (before retirement of the property) the balance sheet would appear as follows:

1

Assets		*Liabilities*	
Plant and Equipment ..	$2,000,000	Stock	$1,000,000
		Depreciation Reserve ..	1,000,000
	$2,000,000		$2,000,000

After retirement the balance sheet would assume the following form (through a credit of $1,000,000 to the Plant account, and a debit of the same amount to the Depreciation Reserve account):

2

Assets		*Liabilities*	
Plant and Equipment ..	$1,000,000	Stock	$1,000,000
	$1,000,000		$1,000,000

If the depreciation reserve were not subtracted from the rate base in balance sheet 1, there would be $2,000,000 worth of property offset by $1,000,000 of stock. A return of 7% on the rate base would amount, therefore, to 14% on the capital invested by stockholders.

An undepreciated rate base is fallacious and unjust because it permits the company to earn a return on property provided by the consuming public. The Washington plan does not commit the full breach, however, for it requires the company to pay 4% for the use of property on which it is allowed to earn 7%.[82]

12. THE COMPANY'S INCOME AND ITS DISPOSITION

The company's income since the sliding scale was inaugurated has been as follows:

Year	*Amount*	*Rate on Rate Base* %	*Excess Earnings*
1925	$3,223,391	9.59	$ 702,777 *
1926	3,510,467	9.72	800,588 *
1927	3,750,997	9.22	698,500 *
1928	4,512,975	10.28	1,220,990 *

* Earnings in excess of 7½% on the rate base.

[82] Under the Dallas plan the rate base is reduced to the extent that property used and useful has been provided out of funds credited to the depreciation account.

If the depreciation reserve is in reality not a reserve but a fund of liquid assets, the annual income from those assets should be credited to the fund, thus lessening payments to be made by the public.

1929	4,946,655	10.31	1,348,837 *
1930	5,286,592	10.70	1,588,666 *
1931	5,268,276	9.56	1,133,854 *
1932	5,170,304	8.80	766,702 *
1933	5,080,999	8.23	757,838 †
1934	4,920,124	7.45	295,001 †
			$9,313,753

† Earnings in excess of 7% on the rate base.

Of the total excess income ($9,313,753) $5,187,148 or 55.7% was utilized in price reductions to and including the year 1935.[33] The *cumulative* savings to consumers during the eleven years have amounted to $37,010,372 or $77 per capita (assuming an average population of 480,000) or $308 per family (assuming one family for every four persons). These figures become $83 and $332 respectively if the public's share of the impounded fund is added. The data are presented in Table XXV.

TABLE XXV

SAVINGS TO CONSUMERS, 1925-1935 (*Cumulative*)

	Savings by Years	*Cumulative Savings by Years*	*Cumulative Savings to Date*
1925	$762,352	$762,352	$762,352
1926	762,352		
	352,164	1,114,516	1,876,868
1927	1,114,516		
	430,829	1,545,345	3,422,213
1928	1,545,345		
	337,895	1,883,240	5,305,453
1929	1,883,240		
	624,062	2,507,302	7,812,755

[33] The cumulative savings *by years* amount to $5,949,500 which is $762,352 greater than the $5,187,148 shown above. The difference represents the reduction made at the beginning of 1925, not out of excess income arising under the decree but by virtue of the price reduction provided in the decree.

1930	2,507,302 660,035	3,167,337	10,980,092
1931	3,167,337 830,463	3,997,800	14,977,892
1932	3,997,800 861,023	4,858,823	19,836,715
1933	4,858,823 563,335	5,422,158	25,258,873
1934	5,422,158 379,841	5,801,999	31,060,872
1935	5,801,999 147,501	5,949,500	37,010,372

Actual savings to consumers have been greater than these figures indicate, for the latter are based on the assumption that consumption in the ensuing year would be no greater than it was in the previous period, whereas each year's consumption has been greater than that of the previous year throughout the era under observation.

The divisible excess income has been distributed in the form of price reductions, with approval of the commission, in the following proportions:

	Allotment	*% of Gross Revenue Contributed 1925–'34*
Residential	47.43	34.61
Apartment and Office Building	4.00	3.79
Small Commercial	33.60	37.62
Large Commercial	11.26	16.75
Street Lights	3.71	7.23
	100.00	100.00

No formula for an equitable distribution of supernormal income among the various classes of consumers and twelve rate schedules has been devised: it is a matter of judgment mutually agreed to by the company and the commission. So far no controversy has arisen over this question.

Due to the company's exceptionally conservative capital structure, earnings on the common stock appear abnormally

large. The earnings per share from 1925 to 1934 inclusive have been as follows:

	% of Par Value
1925	38.3
1926	41.5
1927	44.7
1928	55.1
1929	62.1
1930	68.0
1931	64.6
1932	62.4
1933	60.3
1934	53.4

Less than half the earnings available, on the average, have been paid as dividends, the remainder having been credited to surplus.[34]

13. CUSTOMERS AND CONSUMPTION 1926[35] TO 1933[36]

From the end of 1926 to the end of 1933 the *total* number of Pepco customers increased 51% as compared with an increase of 19.7% among the power companies of the nation as a whole. *Domestic* customers increased 61% in Washington, but only 21.5% in the nation. Commercial customers (retail and wholesale combined) increased 3% in the District of Columbia, and 12% in the nation. It is evident

[34] There are only 60,000 shares of common stock outstanding and the amount may not be increased without approval from congress.

All voting stock of the Pepco is owned by the Washington Railway and Electric Company and the latter is controlled by the North American Company through the ownership (in its own name) of 74,874 shares of W. R. E. Co. stock out of a total of 150,000 shares outstanding, while "an additional 150 shares of voting stock were [are] held in the names of nominees of the North American Company, making a total of 75,024 shares or 50.016 per cent". (See Twentieth Annual Report of the P. U. C. D. C. (1932), p. 103.)

[35] Accurate customer and consumption data by schedules for Washington, D. C. date from the year 1926.

[36] The District of Columbia became a "boom" city toward the end of 1933. Therefore it is necessary to use 1934 data with considerable reserve and discretion.

that in the District of Columbia the relatively greater increase in total customers is to be accounted for mainly in terms of domestic consumers.

The increase in *consumption* has been more remarkable. In 1933, central electric stations in the United States distributed 17% more power to ultimate consumers than they did in the year 1926; but in the District of Columbia there was an increase of 107%. For the nation as a whole *domestic* consumption increased 75%, but in Washington it increased 204% between 1926 and 1933. Commercial retail consumption was only 32% greater in the nation in 1933 as compared with 1926, but in Washington it was up 115%.

Most of these gains in the District of Columbia occurred during the depression years (1930 to 1933 inclusive) as indicated by a comparison between the rates of increase during the four-year period 1926 to 1929, and those of the period 1930 to 1933. The year-end figures for central station customers for the four pre-depression and the four depression years are as follows:

CENTRAL STATION CUSTOMERS

	U. S % Increase		*D. C. % Increase*	
	1929 over 1926	*1933 over 1929*	*1929 over 1926*	*1933 over 1929*
Total	19	.6	31	16
Domestic	21	.2	35	19
Commercial Retail and Wholesale	9	2.7	9.6	(6)

( ) indicates decrease.

In the nation as a whole the total number of consumers remained practically constant during the depression years, although there was a 19% increase during the pre-depression years. In Washington, on the other hand, there was a 16% increase in the number of customers of all classes during the 1930-1933 period, and a 31% increase from 1926 to 1929. Among domestic consumers likewise, the District

outstripped the nation. Commercial power users decreased in the district during the depression, however, and increased in the nation.

Allocation of the power output shows more startling changes, as the following table indicates:

DISTRIBUTION OF CENTRAL STATION ENERGY TO ULTIMATE CONSUMERS

	U.S % Increase		*D.C. % Increase*	
	1929 over 1926	*1933 over 1929*	*1929 over 1926*	*1933 over 1929*
Total	34	(12.7)	43	44.8
Domestic	43	22.4	71	77.8
Comm'l. Retail	38	(4.8)	63	31.8
Comm'l. Wh'l's'le	36	(23.9)	7	25.5

( ) indicates decrease.

Only the domestic class increased its consumption in the nation between 1929 and 1933 while all classes in the District took more energy during the depression. In comparison with the 22.4% increase in domestic consumption in the nation we should note the 77.8% increase which occurred in the District.

An increase in total consumption among any class of consumers may occur because of an increase in the number of consumers in that class, or an increase in consumption by individuals in that group, or in consequence of both factors. The foregoing figures should, therefore, be broken down into individual consumption data. This has been done for domestic consumers for they constitute the mainstay of most electric companies. The number of kwh consumed per domestic customer has been as follows:

	U.S.	*D.C.*
1926	414	470
1929	489	594
1933	598	885
1934	624	959
Increase, 1926–1934	51%	104%

In 1926 domestic consumers in Washington took about 14% more energy on the average than those in the nation; in 1929, about 22% more; in 1933, 48% more, and in 1934, 54% more. Between 1926 and 1934 inclusive, the American household customer, on the average, increased the use of electricity in his home 51% while the average householder in Washington increased his domestic consumption 104%.

The average domestic price per kwh in the nation at large and the District of Columbia for the respective years was as follows:

	U. S.	*D. C.*
1926	7.2c.	6.78c.
1929	6.7	5.13
1933	6.1	3.54
1934	5.1	3.36

Domestic prices thus appear to have decreased about 29% in the nation and about 50% in Washington between 1926 and 1934. Increased consumption and the consequent use of more energy in the lower price categories, as well as actual price reductions, have combined to bring about these results.

It is interesting to note also, in passing, that the average annual bill of domestic consumers in Washington remained about the same ($31.87 in 1926 as compared with $32 in 1934) despite an increase of 104% in domestic consumption; while in the nation it increased from about $30 in 1926 to about $32 in 1934. In Washington, increases in consumption were offset by decreases in prices; in the nation, consumption increased relatively more than prices decreased.

CHAPTER IX

Shall the Sliding Scale be Given Credit for the Achievements in Washington? A Study in Etiology

We have noted in the foregoing review four significant accompaniments of the sliding scale in Washington, namely

Regular and substantial decreases in prices to consumers;
A relatively high level of corporate income;
An increase in the number of customers; and
A large increase in the volume of consumption, especially among domestic consumers.

It is a necessary part of our inquiry to determine the factors responsible for these rather notable developments. Four potential causes suggest themselves:

1. An essential prerequisite to greater consumption of electric energy is the ownership of relatively expensive energy-consuming devices (such as refrigerators, oil burners, coal stokers, kitchen mixers, vacuum cleaners, etc.). Whether or not consumers own any or all of these instruments depends to a large degree upon the amount of money they have to spend. We shall, therefore, compare the economic status of Washingtonians with that of the average American urbanite.

2. Washington, D. C. may be a unique city, possessing features conducive to the success of such a scheme as the sliding scale.

3. As the plan provides a definite reward to the company for improving its efficiency and economy the company may

have improved its operating standards, thus facilitating a reduction of prices.

4. The Utilities Commission of Washington, D. C. has established a record of effective regulation, and may be entitled to a large measure of credit for the ostensible success of the plan. Each of these possible causes will now be considered.

I. ECONOMIC STATUS OF WASHINGTONIANS

(a) Personal Incomes: A considerably larger proportion of Washingtonians file income-tax returns than is true of the urban population [1] of the United States as indicated by the following figures:

PERCENTAGE OF POPULATION FILING INCOME TAX RETURNS

	U.S.	*D.C.*
	%	%
1929	6.07	9.88
1932	5.26	14.91

This indicates a *decrease* of 13% between the two years in the nation and an *increase* of 51% in Washington, before the sweeping changes in personnel of the Federal Government were introduced by President Roosevelt. The average net income per return declined 51% in the nation and 42% in Washington during the depression years shown:

	U.S.	*D.C.*
1929	$6,132	$5,038
1932	3,006	2,904 [2]

[1] Includes population living in centers having 2500 or more inhabitants. The number estimated by the author was 66,650,000 in 1929 and 73,700,000 in 1932.

[2] The average income per return for the nation is pulled upward by the relatively large incomes of a few taxpayers. The consumption of electricity will be greater (other things remaining equal) in a community where incomes are "adequate" and uniformly distributed, than in one where a relatively few individuals have large incomes and the underlying

Another investigation indicates that Washingtonians comprise the second highest income group in the United States, ranking just below the average non-farm resident of New York State, whose income from occupation [3] was $843 in 1929, while that of the average Washingtonian for the same year was $825. Non-farm incomes of other communities ranged downward to $369 (for South Carolina).[4]

(b) Telephones in use have long been considered an index of economic status. Between the years 1929 and 1933 inclusive, there was an *increase* of 12.5% in the number of telephones in use in Washington, and a *decrease* of 15% in large cities of the United States as a whole.[5]

(c) Radio sets owned: 50% of urban families in the United States, and 53.9% of the families in Washington, D. C., had radio sets in 1930.[6]

(d) Employment: 49.5% of the total population of the United States, ten years of age and over, were gainfully occupied at the time of the Federal census of 1930, while for the District of Columbia the corresponding figure was 58.2%. Among the male population 76.2% in the nation, and 78.4% in Washington were gainfully occupied. Among females, 22% in the nation and 40% in Washington were

masses relatively small ones, even though the average income in both communities may be the same. Families living slightly above a subsistence level cannot afford to buy relatively expensive energy consuming devices, while those who can easily afford to do so would not consume enough additional energy to compensate for the low consumption of the poor, due to the fact that the amount of electricity taken by a device is determined more by the nature of the instrument and the work it has to do, than by its owner's capacity for expenditure.

[3] Which excludes returns from the sale, as well as ownership, of property.

[4] From Leven, Moulton, and Warburton: *America's Capacity to Consume*, Brookings Institution, 1934, pp. 48 and 176.

[5] The Washington increase may be accounted for in part by an expansion in the number of government telephones after March, 1933.

[6] Census, 1930, Population, vol. vi, p. 53, Table 60.

gainfully occupied. Moreover, of the 243,853 persons over ten years of age in the District of Columbia who were gainfully occupied in 1930, 77,370 or 32% were employed by the Federal and District governments combined.

(e) Motor car registrations: in the year 1929 there was one pleasure car for every 3.57 persons in the District of Columbia; in 1933, one for every 3.7. In the United States at large, one for every 5.26 persons in 1929, and one for every 6 persons in 1933. This represents a decrease of 3.64% during the depression in Washington, and 14% in the nation.

(f) Savings bank deposits: according to figures made available by the American Bankers' Association there was a decrease of 24% for the nation in savings in all banks (including time certificates and postal savings) between 1929 and 1933. In the District of Columbia the decrease was 16%.

(g) Savings per capita: this variable dropped from $235 to $170, or 27.6% for the nation between 1929 and 1933, and from $178 to $168, or 5.6% for the District, thus indicating a relatively more stable condition in Washington.

(h) Number of individual deposit accounts: these decreased 30% in the nation and 20% in the District.

(i) Department store sales: the volume decreased 39.6% in the nation and 21% in Washington between 1929 and 1933.[7]

None of the foregoing changes can be accounted for in terms of differential population growth, for while population of the United States at large increased 3.4%, that of Washington grew only 2.4% between 1929 and 1933.[8]

[7] For national figures see Annual Supp. 1932, *Survey of Current Business*, p. 49; and April, 1934 *Survey of Current Business*. Washington data supplied by Bureau of the Census.

[8] The national population has been estimated at 121,526,429 in 1929 and 125,693,000 in 1933; that of Washington, 483,262 and 495,000 respectively.

These data point to the conclusion that the citizens of Washington enjoy a higher level of economic well-being on the average, than do citizens of other communities; and that the population of the District of Columbia is insulated to a degree from some of the tribulations of economic depression, due no doubt to the presence of the Government as an employer.

2. IS THE CITY OF WASHINGTON UNIQUE IN OTHER RESPECTS?

(a) The Load Factor: Pepco serves many government buildings where office hours end at 4:30 P. M. The residential lighting load of a city does not begin to pick up until about this time, or a little later. It has been said, therefore, that the absence of an overlap in these important loads tends to give this company a higher load factor [9] than power plants

[9] The load factor indicates the percentage which average daily use is of the fifteen, thirty, or sixty minute peak, or maximum use during the year. In its Electric Power Survey (1934-1935) the Federal Power Commission asked reporting companies for their load factor based on the maximum 60 minute kw peak, the formula for which is,

$$\%LF = \frac{\text{Annual kwh}}{\text{Max. 60 minute kw peak} \times 8760} \times 100$$

The factor 8760, represents the number of hours in a year.

If the investment cost (including the distribution system) is, say, $400 per kw of demand, then consumer X who uses one kw per hour throughout the year, will consume 8760 kwh of energy at an investment cost to the company of $400. But if consumer Y chooses to use 8760 kwh during a period of *one* hour and take no more energy during the remainder of the year, the company will be compelled to install equipment to the value $3,504,000 which will remain idle as far as Y is concerned during the remaining 8759 hours of the year. Clearly that company whose customers conform to X's type is better off than the one whose customers conform to Y's. X's load factor is 100%; Y's is only a little over 1%. The load factors of the system's customers make up the load factor of the system. The higher the system's load factor the smaller the relative fixed investment may be for a given annual output of energy, and hence the lower the rates to consumers may be, other things remaining the same.

in other cities enjoy. This assumption, however, is not true. Load factors based on the maximum 60-minute peak in 1933 for a random selection of companies were as follows:

	%
Consolidated Gas and Electric Co. (N. Y.)	50
Tacoma (Washington)	55
Seattle (Municipal plant)	47
Cleveland	48
Detroit Edison	50
Cons. Gas, Elect. Light & Power Co. (Baltimore)	53
North American Co.	51
Niagara Hudson (System)	66
Average	52.5
Pepco	45

The relatively lower Pepco load factor is to be expected inasmuch as the load factor tends to decrease as the proportion of a station's output sold to domestic customers increases. The proportion of domestic to total sales for three companies has been as follows:

	%	
Pepco	24	(Year 1934)
Cleveland Electric Illuminating Co.[10]	17	(" ")
Union Electric Light & Power Co. (St. Louis) [10]	14	(" ")
National average	18	(" 1932)

(b) Population density: This variable affects the cost of distribution. According to the Federal census of 1930 the 96 metropolitan districts of the United States having 100,000 or more inhabitants, had 1,497 inhabitants to the square mile. In the metropolitan district of the City of Washington the corresponding figure was 1,281. The central cities which formed the hubs of these metropolitan districts had 8,227.6 inhabitants per square mile, while Washington, the central city of its metropolitan district, had

[10] Reference is made from time to time to the Cleveland and St. Louis companies because prices in St. Louis are now about as low as they are in Washington, and in Cleveland they are nearly as low. In St. Louis there is competition with the Laclede Power and Light Co., and in Cleveland the private company competes with a municipal plant.

7,853. Thus, the population density of Washington, D. C. is lower than it is in other cities and metropolitan areas, on the average, which accrues to the disadvantage of the Pepco.

(c) Customer density:[11] comparative figures for the nation and Washington for two selected years are as follows:

CUSTOMER DENSITY

(Ratio urban domestic consumers to total population)

	1927[12] %	*1932*[12] %
National average	24.8	26.8
Washington, D. C.	20	28

In 1927 Washington was below the average; in 1932 it was slightly above, but hardly enough to give the company a marked advantage. The Washington figure is kept close to the national average in part by the fact that about 27% of the population of the District is colored (1930 census).[13]

(d) Taxes: The Pepco enjoys no tax advantage due to its location in the nation's capital. In 1932, a representative year, the Pepco paid 9.87% of its gross operating revenue as taxes, while all power stations reporting in the Federal census of that year paid 10.73%.[14]

[11] Customer density, i. e., the proportion of customers to total population, is not strictly an independent variable: a company may improve its density factor by pursuing an aggressive new-business campaign. Nevertheless, the economic status of citizens imposes limits upon the possible success of such a policy.

[12] These two dates have been selected because they are the years of the Quinquennial Federal census of the electric light and power industry.

[13] The national average represents the ratio of urban domestic consumers to the estimated urban population (persons living in communities having more than 2,500 inhabitants).

[14] The foregoing analysis leads to the conclusion that Washington is a typical American city. A friendly critic, however, feels that it is atypical because a larger proportion of the population is transient than is true of other cities on the average. A transient population does not install permanent or semi-permanent energy-consuming devices such as refrigerators, electrically driven coal stokers or oil burners, ranges and water heaters. This is true to a degree; but most transients live in hotels

3. DID THE PEPCO IMPROVE ITS OPERATING STANDARDS DURING THE FIRST TEN YEARS OF THE SLIDING SCALE?

One of the assumptions implicit in the Washington Profit-sharing Plan is that it tends to superinduce greater efficiency on the part of management, and that this will produce ultimately larger earnings for the latter, and lower prices to the public. Can the apparent success of the Washington experiment be traced to enhanced efficiency on the part of the company?

No technique has yet been devised for the measurement of efficiency in the overall operation of an electric power plant from the coal hoppers to the customer's fuse box. It is generally assumed, however, that the operating ratio of a plant should not be greater than 100 minus 10 times the ratio of investment (rate base) to gross earnings. Substituting Pepco figures for the year 1933,

$$R = 100 - 10 \times \frac{61{,}759}{11{,}120}$$

we note that the operating ratio for that year should not have exceeded 44.46%. It was 56% (if maintenance, taxes, and depreciation are included in the operating expenses).[15]

or apartments where refrigerators, heat, cookstoves, and hot water are furnished. Consequently I feel that a comparison between Washington an the average American city is valid.—THE AUTHOR.

[15] An officer of the Pepco feels that I have not given the company sufficient credit for its endeavor to make the experiment succeed. If this is true it has been neither conscious nor deliberate. I feel intuitively that it is operated with more than average economy and efficiency; but as I have not been able to measure the phenomenon it seems preferable to leave the question indeterminate.—AUTHOR.

Certain other ratios were calculated in the hope that they would throw some additional light on the performance of the company, but on the whole the results were negative. In the formula or formulas which ultimately will be developed the ratios about to be discussed will doubtless play a part; but to date they have not been welded into such a yardstick. They are as follows:

Generating plant investment per kw of generating capacity: Exceptional economy in this item may conduce to lower prices, although it is

A relatively small bonded debt in relation to total capitalization is desirable because it permits greater freedom in experimenting with price reductions; that is, a temporary decline in net earnings is less likely to render a lightly bonded company insolvent. Net funded debt of the composite

a function of at least two variables, namely, the price level at the time of construction, and the decision as to whether it is economically preferable to erect a costly plant which will consume less coal, or a cheaper plant which will consume more coal. The cost of steam-generating plants per kw of generating capacity ranges from about $75 to $135. The cost per kw capacity of nine steam generating stations selected at random is as follows:

Buzzard's Point and Benning, Combined (P. E. P. Co.)	$81
Lakeside	83
Trenton Channel	98
Miami Port	112
Calumet	122
Philo	122
Delaware	126
Cahokia	134

The Pepco, it is seen, occupies first place. This is to be accounted for in part by the fact that the Buzzard's Point station, which is now the company's most important unit, was erected in 1933-'34 when construction costs were relatively low.

Investment per kwh sold to ultimate consumers: For the nation at large this item was $11.81 in 1922, $14.67 in 1927 and $19.51 in 1932, thus indicating an increase of 65% during the ten years. In Washington the figure was $17.08 in 1922, $16.28 in 1927, and $13.98 in 1932, thus indicating a *decrease* of 18% for the ten years. Here is a clear illustration, however, of the unreliability of the ratio. The decrease in Washington is doubtless due to the increase in consumption and not to a decrease in the investment per unit of output. The influences responsible for greater consumption, therefore, are the causal factors.

Capacity factor: This measure is sometimes confused with the use factor. Here, the capacity factor is taken to be the ratio of the peak to the capacity while the use factor may be defined as the ratio of average output to capacity. Little use can be made of either, however, because national averages are not available and a comparison with St. Louis and Cleveland would be misleading due to the importance of industrial loads in those two cities.

Expenses per kwh sold to ultimate consumers: This item amounted to 2.21c. in 1922 and 2.37c. in 1932 for the U. S. as a whole, which represents an increase of 7.24% during the ten years; while in Wash-

American power plant in 1922 amounted to 48.5% of total capitalization (including surplus); in 1932 it was 45.7%, a decrease of only 4.44%. The Cleveland Electric Illuminating company reduced its proportion 35%; the Union Electric Light and Power Co. of St. Louis *increased* it 3%. The Pepco ratio was 54% in 1922 and 20.5% in 1932,—a *decrease* of 62%. In the latter year the Pepco ratio of net bonded debt to total capitalization and surplus was 55% below the average for central power stations of the United States.[16]

Maintenance: A company may bleed its properties by failing to maintain them adequately, thus profiting in the present at the expense of the future. This does not appear to have

ington it was 2.75c. in 1922 and 1.49c. in 1932, having declined 46% during the period. This again, however, reflects increased consumption primarily, although increased operating efficiency may have played a part. This figure is influenced by the industrial load also. A system which has depended upon power consumption for the sale of a large proportion of its power will show an increase in the expenses per kwh sold if the power load slumps as it has throughout the nation during the depression. Hence, without additional information little use can be made of the ratio.

Revenue per kwh sold: The size of this item tends to decrease as the volume of power sold at wholesale prices increases. The typical American plant sold 82% of its output to commercial customers in 1932 while the Pepco so disposed of 76%. Yet it is significant that the price for the nation was 2.88c. while that for Pepco was 2.87c.

The property turnover ratio: Generally speaking, the property turnover ratio tends to rise with population and customer density, although increased use will have the same effect as increased density. If a company's gross revenue averages $1,000,000 a year and its net property valuation is $4,000,000, it tends to "turn" its property once every four years; the property turnover ratio is ¼ or 25%. In 1932 the property turnover ratio for the average American steam electric plant was 17% and that for Pepco 25%. The former "turns" its property once in six years, and the latter once in four years. Here again, increased use rather than an exceptionally economical overall plant investment is probably the most important factor.

[16] This change in capital structure has been reflected in the number of times fixed charges have been earned:

been the case in Washington, where 5.68% of gross revenue was used for maintenance in 1932, as compared with 4.18%, the national average. The Pepco figure was thus 36% higher.

TABLE XXVI

COMPARATIVE PRICES OF MANUFACTURED OR MIXED GAS FOR RESIDENTIAL SERVICE (AS OF 1934)

City	*For Monthly Consumption of 3000 C. F. Gas at Heating Value of 600 B. T. U. (In dollars per M. C. F.)*	*Rank*	*For Monthly Consumption of 5000 C. F. (In cents per therm)*	*Rank*
Washington, D. C.	$2.56	1	13.7c.	1
Detroit	2.61	2	14.6	2
Birmingham	2.67	3	14.8	3
Milwaukee	2.71	4	14.8	4
Indianapolis	2.98	5	16.7	8
Philadelphia	3.00	6	16.4	7
Baltimore	3.06	7	16.2	6
Minneapolis	3.14	8	16.	5
Rochester, N. Y.	3.35	9	18.6	9
Providence	3.54	10	18.8	10
New York (Con. Gas)	3.85	11	21.4	13
Boston	3.97	12	20.8	11
Cleveland	4.01	13	22.3	14
Newark	4.13	14	21.	12
Racine	4.33	15	23.3	16
Richmond, Va.	4.38	16	24.1	17
Wilmington	4.50	17	25.	18
Seattle	4.63	18	26.7	19
New York (Bronx Gas)	4.68	19	27.	20
Nashville	5.22	20	23.1	15

Good management embraces not only high efficiency ratios, but harmonious and amicable public relations. There can be no doubt that the Pepco has been on better terms with the public during the last ten years when the sliding scale has been in force than it was before.

(Note 16, continued.)

	Times Fixed Charges Earned		
	1922	*1927*	*1932*
U. S. Average	2.12	2.67	2.36
Cleveland E. I. Co.	2.51	3.76	3.94
Union E. L. P. Co (St. Louis)	3.2	4.6	2.09
Pepco	2.15	7.99	9.86

TABLE

EARNINGS ON

(Potomac Electric

1	2	3	4		5
Year ending Dec. 31	Amount Available for Dividends[h]	Amount of Preferred Stock outstanding	Amount Paid on Preferred Stock		Amount of Common Stock outstanding
			$	%	(Par $100)
1896 . . .	8,165[d]	—	—	—	—
1897 . . .	5,559[d]	—	—	—	—
1898 . . .	24,502	—	—	—	—
1899 . . .	22,219	—	—	—	—
1900 . . .	11,401[d]	—	—	—	—
1901 . . .	3,753	—	—	—	—
1902 . . .	71,906[i]	—	—	—	—
1903 . . .	283,753	—	—	—	—
1904 . . .	383,575	—	—	—	—[j]
1905 . . .	446,700	—	—	—	—[j]
1906 . . .	498,521	—	—	—	5,000,000[e]
1907 . . .	607,307	—	—	—	5,000,000[e]
1908 . . .	738,464	—	—	—	5,000,000[e]
1909 . . .	760,013	—	—	—	5,000,000[e]
1910 . . .	830,372	—	—	—	5,000,000[e]
1911 . . .	904,473	—	—	—	5,000,000[e]
1912 . . .	955,580	—	—	—	6,000,000[e]
1913 . . .	1,034,317[h]	—	—	—	6,000,000[e]
1914 . . .	617,425	250,000	25,000	10	5,750,000
1915 . . .	666,942	250,000	27,500	11	
1916 . .	771,861	250,000	27,500	11	5,750,000
1917 . . .	647,094	250,000	27,500	11	5,750,000
1918 . . .	568,780	250,000	27,500	11	5,750,000
1919 . . .	544.903	250,000	22,500	9	5,750,000
1920 . . .	532,818	250,000	20,000	8	5,750,000
1921 . . .	905,086	250,000	25,000	10	5,750,000
1922 . . .	959.861	250,000	25,000	10	5,750,000
1923 . . .	1,029,896	250,000	25,000	10	5,750,000
1924 . . .	1,474,523	250,000	30,000	12	5,750,000
1925 . . .	2,295,724	2,000,000	([b])		6,000,000[e]
1926 . . .	2,598,117	2,000,000	106,128	6[a]	6,000,000
1927 . . .	2,932,162	7,000,000	119,925	6	6,000 000
			128,772	5½	

XXVII

STOCK OUTSTANDING

Power Co.)

6		7		8	9		10	
Available for Common Stock		Amount Paid on Common Stock		Added to Surplus	Available for Common Stock. Prorating the Co.'s portion of the Impounded Fund evenly from 8-1-17 to 12-31-24		Amount Paid on Common Stock. Prorating the Co.'s portion of the Imp. Fund evenly from 8-1-17 to 12-31-24	
$	%	$	%		$	%	$	%
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	515,000	—	—	—	—	—	—
—	—	340,000	—	—	—	—	—	—
—	=	350,000	7.	—	—	—	—	—
—	—	400,000	8.	—	—	—	—	—
—	—	400,000	8.	—	—	—	—	—
—	=	400,000	8.	—	—	—	—	—
—	—	465,346	9.36	—	—	—	—	—
—	—	475,000	9.5	—	—	—	—	—
—	—	530,000	8.83	—	—	—	—	—
—	—	600,000	10.	—	—	—	—	—
592,425	10.3	575,000	10.	17,425	—	—	—	—
639,442	11.1	632,500	11.	6,942	—	—	—	—
744,361	12.9	632,500	11.	111,861	—	—	—	—
619,594	10.8	632,500	11.	12,906[d]	781,393	13.6	794,298	13.8
541,280	9.4	632,500	11.	91,220[d]	929,591	16.2	1,020,810	17.8
522,403	9.1	517,500	9.	4,903	910,713	15.8	905,810	15.8
512,818	8.9	460,000	8.	52,818	901,129	15.7	848,310	14.8
880,086	15.3	575,000	10.	305,086	1,268,397	22.1	963,310	16.8
934,861	16.3	575,000	10.	359,861	1,323,172	23.0	963,310	16.8
1,004,896	17.5	575,000	10.	429,896	1,393,207	24.2	963,310	16.8
1,444,523	25.1	690,000	12.	754,523	1,832,833	31.9	1,078,310	18.8
2,295,724	38.3	840,000[f]	14.	1,455,724				
		2,880,000[g]	48.					
2,491,989	41.5	960,000	16.	1,531,989	—	—	—	—
2,683,465	44.7	1,080,000	18.	1,603,465	—	—	—	—

TABLE

1	2	3	4		5
Year ending Dec. 31	Amount Available for Dividends[b]	Amount of Preferred Stock outstanding	Amount Paid on Preferred Stock		Amount of Common Stock outstanding
			$	%	(Par $100)
1928 . . .	3,699,677	2,000,000(6%)	119,955	6	6,000,000
		5,000,000(5½%)	272,075	5½	
1929 . .	4,120,136	2,000,000(6%)	119,970	6	6,000,000
		5,000,000(5½%)	274,947	5½	
1930 . . .	4,471,725	2,000,000(6%)	119,970	6	6,000,000
		5,000,000(5½%)	274,951	5½	
1931 . . .	4,267,674	2,000,000(6%)	119,970	6	6,000,000
		5,000,000(5½%)	275,000	5½	
1932 . . .	4,142,004	2,000,000(6%)	120,000	6	6,000,000
		5,000,000(5½%)	275,045	5½	
1933 . . .	4,014,164	2,000,000(6%)	120,000	6	6,000,000
		5,000,000(5½%)	275,044	5½	

[a] Amount paid on preferred stock (Col. 4) is not 6% on stock outstanding because full amount of stock was not outstanding the entire year.

[b] No dividend paid in 1925 on this new preferred stock which was issued as of 11-2-25.

[c] Includes preferred stock outstanding.

[d] Denotes deficit.

[e] The preferred stock outstanding hitherto was converted into common stock in 1925, and a 14% dividend declared in 1925, on the combined shares.

[f] Regular dividend.

[g] Special dividend (Paid out of company's portion of the impounded fund.)

XXVII—(*Continued*)

6		7		8	9		10	
Available for Common Stock		Amount Paid on Common Stock		Added to Surplus	Available for Common Stock. Prorating the Co.'s portion of the Impounded Fund evenly from 8-1-17 to 12-31-24		Amount Paid on Common Stock, Prorating the Co.'s portion of the Imp. Fund evenly from 8-1-17 to 12-31-24	
$	%	$	%		$	%	$	%
3,307,647	55.1	1,200,000	20.	2,107,647	—	—	—	—
3,725,219	62.1	1,320,000	22.	2,405,219	—	—	—	—
4,076,804	68.0	1,440,000	24.	2,636,804	—	—	—	—
3,872,704	64.6	1,560,000	26.	2,312,704	—	—	—	—
3,746,959	62.4	1,680,000	28.	2,066,959	—	—	—	—
3,619,120	60.3	1,800,000	30.	1,819,120	—	—	—	—

[h] Figures from 1896 to 1913 inclusive are taken from formal case No. 48, Order 339, p. 39, Schedule D. (Case decided Sep. 4, 1919) and represent "Net Earnings" as the term was used by the valuation accountant in the proceedings here referred to. The method of deriving earnings does not coincide precisely with the determination of the "amount available for dividends" shown for 1914 and following inasmuch as accounting procedure was changed in 1913 (effective in the 1914 report) when the P. U. C. was created.

[i] U. S. Electric Lighting Co. purchased by Potomac Electric Power Co., Sep. 30, 1902. This accounts to a major extent for the enhanced earnings.

[j] Not reported.

TABLE

RESULTS OF OPERATION

	1925	1926	1927	1928
Rate base (weighted) . . .	$33,608,189	$36,131,724	$40,699,952	$43,893,122
Return on rate base . . .	3,223,391	3,510,467	3,750,997	4,512,975
Rate of return (%)	9.59	9.72	9.22	10.28
Return over 7½ %	702,777	800,588	698,000	1,220,990
Return over 7 % . .	. .	. .	. .	.
Available for rate reduction.	351,388	400,294	349,250	610,495
Total sales (kwh)	172,870,215	196,346,210	219,127,838	250,830,975
Average net received per kwh sold (inc. street lights) . .	1.864c.	1.787c.	1.711c.	1.799c.

TABLE

CUSTOMERS AND

		The Nation		
		1926	1929	1933
Central Station Customers at End of Year.	Total	20,292,785	24,147,183	24,295,515
	Domestic	16,457,794	19,967,154	20,004,098[a]
	Com'cl. Retail . . .		3,598,115	3,697,324
	" Wholesale. .	3,834,991[b]	581,914	594,093
Distribution of Central Station Energy to Ultimate Consumers (In millions of kwh.)	Total	56,089	75,294	65,754
	Domestic	6,827	9,773	11,960
	Com'cl. Retail . . .	9,485	13,106	12,475
	" Wholesale. .	32,615	44,326	33,723
	Mun. St. Lt.	1,589	2,038	2,213
	Elect. Ry.	4,951	5,049	4,004
	Elect. RR. . . .	426	590	661
	Muni. and Misc. . .	196	412	718

( ) denotes decrease.

Sources: Energy data (for U. S.) 105 *Electrical World* No. 1, Jan. 5, 1935, pp. 35 and 44.
Customer data (for U. S.) 93 *Electrical World* No. 1, Jan. 5, 1929, p. 30.

XXVIII

UNDER CONSENT DECREE

1929	1930	1931	1932	1933	1934
$47,970,898	$49,372,904	$55,125,620	$58,728,032	$61,759,448	$66,073,182
4,946,655	5,286,592	5,208,276	5,171,304	5,080,999	4,920,124
10.31	10.70	9 56	8.81	8.23	7.45
1,348,837	1,580,666	1,133,854	. .	.	. .
		1,409,741	1,060,342	757,838	295,001
674,419	790,333	860,000	562,000	378,919	147,501
281,262,210	318,972,780	352,085,270	382,460,264	436,557,332[a]	548,128,164
1.759c.	1.657c.	1.496c.	1.352c.	1.163c.	. .

[a] Includes power sold under interchange contract with Consolidated Electric Light and Power Co. of Baltimore.

XXIX

CONSUMPTION, 1926–1933

as a Whole			The District of Columbia Only					
% Increase						% Increase		
1929 over 1926	1933 over 1929	1933 over 1926	1926	1929	1933	1929 over 1926	1933 over 1929	1933 over 1926
19.	0.6	19.7	99,150	129,432	149,670	31.	16.	51.
21.	0.2	21.5	80,470	108,429	129,363	35.	19.	61.
} 9.	2.7 { 2.8 / 2.1 }	12.	18,504	20,334	19,072	10.	(6.2)	3.
			176	138	154	(22.)	11.6	(13.)
34.	(12.7)	17.	196.6	281 3	407.3	43.	44. 8	107.
43.	22.4	75.	37.8	64.7	115.	71.	77. 8	204.
38.	(4 8)	32.	64.1	104 7	138.	63.	31. 8	115.
36.	(23.9)	3.	85 5	91.6	115.	7.	25. 5	35.
28.	8.6	39.	6.4	16.3	23.9	155.	46. 6	273.
2.	(20.7)	(19.)	—	—	—	—	—	—
39.	12.	55.	—	—	8.1	—	—	—
110.	74.	266.	2.8	4.	7.3	43.	82.5	161.

Customer data (for U. S.) 99 *Electrical World* No. 1, Jan. 2, 1932, p. 49.

[a] Includes farm customers except in irrigated regions where they are included with commercial wholesale figures.

[b] Includes commercial lighting, power and miscellaneous.

TABLE XXX

CAPITAL STRUCTURE OF THE POTOMAC ELECTRIC POWER COMPANY, 1914 TO 1933

Year	Bonds (In thousands)				Capital Stock (In thousands)			Surplus End of Year (Free)	Proprietorship Reserve	
					Actually Issued and Outstanding					
	Total Book Liability	In Treasury	In Sinking Funds	Net in Hands of Public	Common	Preferred	Total		Appropriated Surplus [1]	Contingent Reserve [2]
1914....	$7,000	$30	$360	$6,610	$5,750	$250	$6,000	$149,703	$649,437	—
1915....	7,000	0	369	6,631	5,750	250	6,000	156,731	762,432	—
1916....	7,000	0	369	6,631	5,750	250	6,000	275,974	895,856	—
1917....	7,750	0	393	7,357	5,750	250	6,000	263,068	1,054,692	$142,000
1918....	9,850	0	459	9,391	5,750	250	6,000	171,848	1,200,199	566,968
1919....	11,350	0	576	10,774	5,750	250	6,000	177,877	1,365,089	1,076,880
1920....	12,441	1,091	702	10,648	5,750	250	6,000	234,282	1,542,578	1,688,576
1921....	14,950	1,400	817	12,733	5,750	250	6,000	547,348	1,744,020	2,364,496
1922....	14,820.7	1,400	1,039	12,381.7	5,750	250	6,000	906,204	1,950,077	3,448,117
1923....	15,450.9	1,760	1,247	12,443.9	5,750	250	6,000	1,347,166	2,255,603	4,823,312
1924....	15,319.9	1,760	1,259	12,300.9	5,750	250	6,000	2,125,461	2,639,375	6,401,577
1925....	14,447	1,760	1,259	11,428	6,000	0	6,000	3,897,954	3,143,500	653,500
1926....	14,325.3	1,760	1,259	11,306.3	6,000	2,000	8,000	5,403,551	3,088,556	391,908
1927....	12,763	1,760	1,378	9,525	6,000	7,000	13,000	6,901,360	3,380,535	351,756
1928....	12,523	1,761	1,378	9,384	6,000	7,000	13,000	9,598,579	3,677,187	—
1929....	12,443.5	3,416	1,462	7,565.5	6,000	7,000	13,000	12,238,982	3,815,225	—
1930	12,403.5	3,038	1,800	7,565.5	6,000	7,000	13,000	15,932,210	4,146,498	—
1931....	12,305.6	2,785.7	2,105	7,414.9	6,000	7,000	13,000	18,258,011	4,408,942	—
1932....	12,246.4	2,407	2,431	7,408.4	6,000	7,000	13,000	20,341,545	4,779,872	—
1933....	12,198.4	2,075	2,781	7,342.4	6,000	7,000	13,000	22,564,878	4,970,766	—

[1] Consists mainly of Sinking Fund Reserve.

[2] This is the Impounded Fund. By the terms of the first consent decree $2,950,788.40 of this fund was allocated to the company by the court. The company transferred its portion to surplus and paid $2,880,000 to stockholders as a dividend.

4. THE COMMISSION'S PART

The Public Utilities Commission of the District of Columbia must be given credit for fair and conscientious discharge of its duty to the public. Not only is the price of electricity in the city of Washington among the lowest in the United States, but so also is the price of Manufactured gas.[17] Yet there is no sliding scale arrangement applicable to the gas company of Washington.

SUMMARY

This inventory and analysis of influential factors has established six conclusions, namely

1. Washingtonians comprise one of the highest level income groups in the United States. In addition, the people of that community are insulated to a degree from some deleterious consequences of economic depression.

2. The relatively large and well distributed money incomes of Washingtonians enable the latter to purchase energy consuming devices to a greater extent than is true of populations in most other communities, and thus to increase their consumption of electric energy correspondingly.

3. The prospect of future price reductions has removed one of the elements of sales resistance, and has provided appliance salesmen with an additional "talking point" or sales argument.

4. Other local conditions have not been noticeably favorable to the company, or prejudicial to success of the sliding scale as a regulatory device.

5. It is not possible to determine the overall efficiency with which the plant has been operated during the first ten years of the experiment. There can be no doubt, however, that the company's public relations have improved.

6. One of the most important causes of the apparent success of the arrangement is to be found in the tireless, fair, and able supervision rendered by the Public Utilities Commission.

[17] See Table XXVI.

CHAPTER X

A Critique of the Sliding Scale and Some Constructive Suggestions

Four weaknesses underlie the sliding scale, no matter which variant we analyze:

1. No attempt is made to distinguish between *earned* and *gratuitous* super-normal income. The assumption implicit in all plans is and has been that super-normal income is entirely earned,—by the stockholders who receive it.[1] There are three fallacies in this assumption, namely

(a) The typical stockholder in a public utility company takes little part in the administrative affairs of his corporation. In fact, he is little more than a sleeping partner with title to a set of anachronistic vested rights. Moreover, the virtual impossibility, in most cases, of his knowing the officers well enough to pass upon their fitness for office makes stockholder control a legal fiction and voting rights a travesty. Little, if any, super-normal profit of a public utility, therefore, is *earned* by stockholders as a class.[2]

(b) Even in those instances where a group of stockholders does exercise managerial control, they cannot lay claim to the entire supernormal income for the latter arises in a

[1] Although in England there is a growing tendency to share the distributable excess income with employees.

[2] Berle and Means have said, "... The shareholder in the modern corporate situation has surrendered a set of definite rights for a set of indefinite expectations... We have reached a condition in which the individual interest of the shareholder is definitely made subservient to the will of a controlling group of managers..." (*The Modern Corporation and Private Property*, Commerce Clearing House, 1932, p. 277.)

broad sense from two sources, one of which is external to and largely beyond control of the company; the other, internal and therefore subject to the company's influence. *External* factors take at least three forms:

(i) Improvements in technology. Man's increasing power over nature develops out of a growing body of knowledge which is the joint product and cultural heritage of the race. From a strictly logical point of view, public utility customers are entitled to whatever reduction in price this cumulative body of knowledge tends to facilitate as it is applied to the public utility industry. Although a producer of a public service has little or no control over the origin and development of a wider body of knowledge, that fact does not release him from the moral responsibility of utilizing it: for whether he admits the fact or not, a public utility officer is a public servant; as his industry is vested with a public use, he is charged with a public trust of doing his job at least as well as it would be done if it were more highly competitive,—which, in general, means using the best technique the industry affords. For this he is entitled to no extra compensation.

(ii) Changes in the load factor. A large portion of the output of most power plants is purchased by industrial enterprises. Consequently, fluctuation of a power company's load factor is in part a function of industrial activity, or general economic conditions, as well as the number of plants moving into or out of the area. During a period when the load factor is relatively high an electric company will tend to earn more than when it is low. Yet, to a large degree, the causal factors at work here are beyond control of the utility and should not, therefore, authorize either bonus or penalty.

(iii) Changes in the general commodity price level, or in the cost of producing and distributing electric energy in a given locality.

Internal factors are those associated with good management. Managerial functions are creative as well as routine, observes Morgan, and they offer opportunities for the display of administrative ability and superior intelligence. Only that portion of the super-normal income arising from internal economies is justly payable to management.

Although we may experience great difficulty in separating the earned from the unearned surplus, we thus find adequate logical justification for the point of view that not all of the surplus should be paid indiscriminately to stockholders as a class. If compensation were to be made only for internal factors, moreover, it would be paid mainly to those directly engaged in production, which means for the most part, employees from the Chairman of the Board, down.

(c) In another sense it may be said that *any* return above six or seven per cent to the owner of common stock in a public utility (which represents as complete a monopoly as the juro-economic system can afford) is unnecessarily bountiful as far as the stockholder is concerned, and confiscatory as far as the consuming public is concerned.[3] On this assumption the entire excess would be unearned by, and unavailable to stockholders.

2. The second major weakness of the sliding scale lies in the fact that in the United States we have failed to appreciate other possible uses to which super-normal income may be devoted (besides its payment to stockholders). A large, overhanging bonded debt, for example, increases a

[3] A return of say 7% on the rate base commonly amounts to more than this on the company's common stock because the corporation usually pays less than 7% on its bonds and preferred stock, leaving the difference to common stockholders. For example, the Pepco earned 60% on the par value of its common stock in 1933 (due in part to the small number of shares outstanding). A stockholder, moreover, need not necessarily receive excess earnings, in the form of dividends to profit by their accrual inasmuch as the market value of a share is determined more by its earnings than by its dividend.

company's vulnerability in time of emergency and renders it less willing to experiment with new and promotional rates, for fear that consumption will not increase fast enough to offset the reduction in prices; a temporary insufficiency of earnings to meet interest charges may then ensue. Commissions, moreover, will not ordinarily prescribe prices which would endanger a company's solvency. Thus, the regulatory policy of a commission, and the prices paid by consumers, are closely allied with the financial policy of the company. In the interest of a more adaptable capital structure and a more flexible price policy, therefore, that portion of the excess income which is traceable to external factors and hence unearned, might with propriety be used to amortize the company's bonded debt.[4]

3. The third weakness of sliding scale schemes lies in the absence of a system of penalties for sub-standard performance. If a company under the Washington Plan, for example, (as under practically all others) fails to earn the allowable rate of return, it is incumbent upon the commission to elevate prices in the hope of increasing income. The anomaly of this provision becomes apparent when we realize that a return of say, 7% on the rate base (which is considerably more than doube the "pure" rate of interest) is customarily justified as being in part, compensation for risk, —the risk of sub-normal returns and capital loss.

But the risk of sub-normal income has been removed by most regulatory statutes and procedure inasmuch as the standard rate of return is virtually guaranteed. This inconsistency might be corrected by allowing the return on

[4] Railroad, street railway, and gas companies have been notoriously negligent of amortization, which may account for some of their current troubles. See also, Clark, E., *Internal Debts of the U. S.* (Macmillan, 1933), pp. 168-170, statement by Dr. John Bauer. Mr. Basil Manly, Vice-Chairman of the Federal Power Commission also feels that utility debts should be paid off out of super-normal income.

the rate base to remain below standard in those cases where the cause of sub-standard performance is internal and controllable. In so doing, stockholders would be given more incentive than they have at present to see that a public utility serves the public first to the best of its capacity, and its owners thereafter.[5]

The risk-of-capital-loss argument asserts that stockholders must be allowed to reap super-normal rewards during periods of large earnings to compensate for sub-normal income during lean years. It loses much of its weight, however, when applied to the public utility industry where fluctuations in earnings are relatively slight from year to year, although comparatively large from one stage in the life cycle of the industry to another. The electrical street railway industry has gone through the period of youth and maturity and now is in the period of old age. Present-day holders of street railway common stock derive small comfort from contemplating the relatively large earnings paid to stockholders thirty years ago, for today's owners are not the people, in most cases, who received more than adequate dividends a generation ago.

History has virtually repeated itself in the steam railroad field, and it will probably be duplicated in the gas industry. The owners of a generation ago have either died, or have sold their shares. The latter is almost as inevitable as the former due to the fact that insiders are the first to sense the impending failure of an industry or undertaking, and are the first to get out; while outsiders, less qualified to judge, and always a step behind, become the new owners. They

[5] It will never be a simple matter to differentiate between external and internal factors. The importance of devising a suitable technique, however, is a challenge to engineers, accountants, and economists, on whom the development of more effective regulatory methods largely depends.

will bear the losses not as an offset to earlier profits, but as mute testimony to their gullibility and ignorance.[6]

4. The most vexatious problems in American public utility regulation have centered around valuation of the rate base, and the rate of return. The sliding scale contributes little to the solution of these issues.

Conclusion

Notwithstanding the foregoing deficiencies, the sliding scale method of regulating public utilities, even in its present unrefined state, is a more satisfactory form of control than conventional American procedure inasmuch as the sliding scale provides for automatic adjustment of otherwise controversial issues (once the rate base and the rate of return have been settled). Long, costly, and disquieting litigious controversies tend to be superseded by brief annual hearings for the purpose of finding the company's earnings during the preceding period and adjusting prices for the current year.

The plan patently is imperfect; but as its weaknesses are chiefly administrative it will become a better method of regulation in proportion as more companies and commissions give attention to it.

[6] There is some similarity between the general proposal here made, and the old maximum dividend system which was first used in Great Britain eighty years ago, except that in the plan here suggested, not dividends but the maximum rate of return on the rate base would be fixed.

APPENDIX

To compare the cost of gas and electricity, both forms of energy should be reduced to their effective heat values in terms of British Thermal Units.[1] We note in the following table the conversion, combustion and application efficiency of gas and electricity in two uses,—cooking and water heating:

COMPARATIVE THERMAL EFFICIENCIES

Kind of Heat	Unit	No. BTU per Unit	Conversion Efficiency %	Application Efficiency (%)	
				Cook Stove	Water Heater
Electricity . . .	1 kwh	3,410	100	85	100
Gas	1 MCF	535,000	75[2]	85	85

To derive from these figures, the effective heat value in those two uses, in terms of BTU, the following calculation is necessary:

Electricity:

	Effective Heat Value in BTU
1 kwh = 3,410 BTU × .85 (cookstove) ..... =	2,915
1 " = " " × 100 (water heater) ..... =	3,410

Gas:

The efficiency of gas in cooking and heating water is the product of its combustion and application efficiences (.75 × .85 × 100 = 64%). Therefore

1 MCF = 535,000 BTU × .64 ..... = 342,400

[1] In this discussion I am drawing upon a most illuminating conference with Mr. James I. Metcalf, Consulting Engineer to the New York State Power Authority. It is his method of stating the equivalent effective heat values of the two forms of energy (gas and electricity) in terms of B T U's which I am using here.

[2] Combustion efficiency.

It follows that the effective heat value of I MCF of gas compared to that of 1 kwh of electric energy for cooking purposes is as 342,400 is to 2,915 or 117 to 1; that for water heating purposes is as 342,400 is to 3,410, or 100. The average of 117 and 100 is 108.5 which is the average equivalent effective heat value in BTU of 1 MCF of gas and 1 kwh of electric energy.

If gas costs $1 per MCF then the equivalent cost of electricity will be 1.00/108.5 or a little over 9 mills (9.22) per kwh, at which prices the two forms of energy are on an equal competitive basis for cooking and water heating purposes as far as energy cost alone is concerned.

Under what circumstances, then, and to what extent does electric energy become a competitor of gas? This question leads to an analysis of the approximate volume of energy consumed in the various uses to which electricity may be applied. In the "typical" American home

From	10 to 20	kwh monthly are used for lighting;
"	20 to 40	" " " " " small ap-
Total	30 to 60	pliances such as toasters, percolators, curling irons, washing machines, etc.

On this volume of electricity consumption gas and electricity are not in direct competition with each other. But for refrigeration, cooking and water heating the two forms of energy may be competitive.

Competition with gas starts here.

From	50 to 70	kwh monthly are used for refrigeration.
Total	80 to 130	
From	120 to 170	" " " " " cooking.
Total	200 to 300	
From	250 to 300	" " " " " heating water.
Total	450 to 600	

The electric rate which applies to these latter uses and volumes is the one which is in competition with the price of gas.

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